Interlanguage of Japanese learners of English: Judgements on the translatability of two polysemous Japanese lexemes

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Appendices

7.1.4 SVs

1. KOC3 1081 2. KOK1 1082 3. KOK2 1083 4. KOU1 1084
5. KOU2 1085 6. YAC3 1086 7. YAK1 1087 8. YAK2 1088
9. YAU1 1089 10. YAU2 1090

7.2 Translatability acceptance scores

Table 1	KOC3	1091	Table 2	YAC3	1092
Table 1_a	KOC3	1093	Table 2_a	YAC3	1094
Table 3	KOK1	1095	Table 4	KOK2	1096
Table 5	KOU1	1097	Table 6	KOU2	1098
Table 7	YAK1	1099	Table 8	YAK2	1100
Table 9	YAU1	1101	Table 10	YAU2	1102

7.3 SV, DD & T_g

1. KOC3 1103 2. KOK1 1109 3. KOK2 1115 4. KOU1 1121
5. KOU2 1127 6. YAC3 1133 7. YAK1 1138 8. YAK2 1144
9. YAU1 1150 10. YAU2 1156 11. YAK1B[8] 1162

1, 2 & 8

YAC3 dealt with 10 items, although all the other groups dealt with 11 items. In order to compare YAC3 and YAK1, YAK1B was calculated using the YAK1 data. YAK1B deals with the same 10 items of YAC3.

3, 4, 5, 6 & 7

In reconstructing the maps of inference for YAC3 and YAK1, the MDS configuration obtained from YAK2 was used, since YAC3 and YAK1 produced highly "degenerate" results.

Appendix 1 Translations of the Japanese sentenses tested

Conventions used for the translations are listed below:

1. Japanese does not have articles, but they are supplied in the translation if necessary: e.g. kowasu 1&2 kudaku 1&3. Since in English "new information" rarely occurs in the subject position, the subjects in the translation are all marked for the specific the.

2. What is understood from the context is normally deleted in Japanese, e.g.,kowasu 4&5 and oru 1 where the sentences do not specify whose stomach or whose plan etc. The deleted information is supplied in the translations.

Another type of ellipsis which is familiar to a Japanese reader is the deletion of subject. When agentive subjects are deleted (e.g. yaburu 1&2, oru 2&5 and kudaku 7&9), Japanese readers assume that the addresser is talking about himself. Therefore, I was inserted in the translations.

The absence of honorifics often serves as a clue to indicate what is deleted: e.g. oru 3&6, kowasu 6,8&9 and yaburu 8. The absence of honorifics shows that addressees are casual relations of the addresser's.

In what follows, Japanese sentences with note-form grammatical information are presented. Since some of the particles occur very often, they are explained here:

(1) ga -- a case marker (subject) to show that what precedes it is the subject.

(2) wo -- a case marker (object) to show that what precedes it is the direct object of a following verb.

(3) no -- When it occurs in the pattern Noun + no + Noun, the first noun modifies the second, i.e., A no B = B of A. There is theoretically no limit to the number of times this particle may occur in a sequence of this kind, e.g. A no B no C no D; e.g. kowasu 5&9, yaburu 8, and oru 7. That is to say, any noun which is already modified by an expression in the form A no may itself modify a following noun, which may in turn modify yet another noun and so on. In other words, it is a 'recursive' modification.

(4) wa -- a topic marker.

One of the commonest Japanese sentence-patterns is topic plus comment. When a topic-comment sentence is translated into English, the topic marked by wa will normally be rendered as the subject or object of a verb. But in Japanese, wa only indicates that what follows it is a statement or question about the topic in question. A topic phrase itself does not always imply any specific grammatical relationship between the topic and comment. Thus, a topic marked with wa may in fact be the direct object of a verb embedded in the following comment; e.g. yaburu 9.

kowasu (break)

kowasu (vt)	kowashi-ta (vt+past)
kowareru (vi)	kokware-ta (vi+past)

1. concrete vi	5. abstract vi
2. concrete vi	6. abstract vi
3. concrete vt	7. abstract vi
4. concrete vt	8. abstract vi
	9. abstract vi

1. Chawan (cup) ga kowareta.
   The cup broke.

2. Kasa (umbrella) ga kowareta (broke).
   The umbrella broke.

3. Ano (that) jiko (accident) irai (since), kare (he) wa karada (body-metaphorically health) wo kowashiteiru (='kowashi:intransitive verb + te:connector of verb + iru:stative marking supplementary verb'='has been broken').
   Since the accident, his health has been broken.

4. Tabesugi (over-eating) de (particle of cause) hara (abdomen) wo kowashita (broke).
   Over-eating upset my stomach.

5. Nakata-kun (Mr. Nakata) no (of) totsuzen (suddenness) no houmon (visit) de (particle of cause) keikaku (plan) ga kowareta (broke).

Mr. Nakata's sudden visit upset (disturbed) my plan.

6. Musume (daughter) no endan (arranged marriage) ga kowareta (broke) node (conjunctive particle of reason) chichioya (father) ga komatta (worried).

His daughter's arranged marriage fell through and the father worried.

7. Yamamoto-san (Mr. Yamamoto) no sei (cause) de (particle of cause) koushou (negotiation) ga kowareta (broke).

Because of Mr. Yamamoto, the negotiation was broken off.

8. Otouto (brother) ga yokeina (unnecessary;tactlss) koto (things) wo itta (said) node (conjunctive particle of reason) kibun ((good)mood) ga kowareta (broke).

My brother's tactless remark upset me (destroyed my good mood).

9. Chichi (father) no byouki (illness) de (particle of cause) watashi (I) no toei (going to Britain) no yume (dream) ga kowareta (broke).

My father's illness put an end to my dream of going to Britain.

yaburu (tear)

yaburu	(vt)	yaburetta	(vt+past)
yabureru	(vi)	yaburetta	(vi+past)

1. concrete vt	6. abstract vt
2. concrete vt	7. abstract vt
3. concrete vt	8. abstract vt
4. abstract vt	9. abstract vt
5. abstract vt	

1. Sukaato (skirt) wo yabutta (tore).

I tore a skirt.

2. Kasa (umbrella) wo yabutta (tore).

I tore an umbrella.

3. Kaminari (thunder) ga chinmoku (silence) wo yabutta (tore).

The thunder broke the silence.

4. Harada-san (Mr. Harada) wa kisoku (rule) wo yabutta (tore).

Mr. Harada broke the rule.

5. Namiko-san (first name of a girl + san;polite) wa boku (I;male) no koigokoro (heart, love) wo yabutta (tore).

Namiko broke my heart.

6. Sumisu (Smith) ga sekai-kiroku (world record) wo yabutta (tore).

Smith broke the world record.

7. Yamada-san (Mr. Yamada) wa yakusoku (promise) wo yabutta (tore).

Mr. Yamada broke his promise.

8. Chichi (father) no byouki (illness) de (particle of cause) toei (going to Britain) no yume (dream) ga yaburareta (='yabu+rare+ta'='yabu;the stem of yaburu + rare;causative supplementary verb + ta;past marker'='was torn').

My father's illness shattered(put an end to) my dream of going to Britain.

9. Keikaku (plan) wo yabutte (yaburi;verb + te;conjunctive particle, meaning 'and') nichiyoubi (Sunday) wa neteiru (ne;the stem of verb 'neru' + te;connector + iru;stative marking supplementary verb) *koto (function noun for nominalization) ni (particle marking for the aim of action)

shita (suru:do + ta;past marker).

*V+koto ni suru : idiom meaning decide to.

Changing my plan, I decided to spend Sunday in bed.

oru (break, bend, fold)

oru	vt	otta	(vt+past)
oreru	vi	oreta	(vi+past)

1. concrete vi	6. concrete vi
2. concrete vi	7. abstract vt
3. concrete vt	8. abstract vt
4. concrete vi	9. abstract vt
5. concrete vt	10. abstract vi

1. Kasa (umbrella) no e (stem) ga oreta (broke).
The stem of an umbrella was broken.
(was bent)

2. Koronde (korobu;stumble + te;connector) ashi (leg) no hone (bone) ga oreta.
I stumbled and broke my leg.

3. Imouto (younger sister) ga sizukani (guietly) tsuru (crane) wo otteiru (ori;verb + te;connector + iru;progressive marking supplementary verb).
My sister is quietly folding a piece of paper into a crane.

4. Peige (page) no sumi (corner) ga oreteiru (ore + te;connector + iru;resultative marking supplementary verb).
The corner of a page is turned down.

5. Hiji (elbow) wo ottari (ori + tari;particle of repeted action) nobashitari (nobasu:stretch + tari) shita (did).
I bent and stretched my elbow over and over again.

6. Michi (road) wa migi (right) ni (particle-direction) orete (ore + te;connector), umi (sea) ni (particle of direction) deru (appear).
The road bends to the right towards the sea.

7. Mizuno-kun (Mr. Mizuno) wa hito (person, other people) no hanashi (conversation) no koshi (lit. waist*) wo

oru kuse (habit) ga aru (existential 'be').

Mr. Mizuno has a habit of breaking into other people's conversation.

*'hanashi no koshi wo oru' is an idiomatic expression, and it is used when somebody interrupts a conversation and the speaker himself is annoyed at being interrupted.

8. Amari (excessively) jiman-suru (boast) node (conjunctive particle, reason) hana (lit. nose; met. pride) wo otte (oru:bend + te:connector) yatta (yaru;causative supplementary verb. i.e.inflicting an action on the others + ta;past).

Idiom; hana wo oru; lit. bend/break one's nose. i.e. break one's pride.

Since he was so boastful, I put his nose out of joint/ broke his pride.

9. Ga (ego) wo otte (oru:break + te:connector) dakyoushi-ta (dakyou:compromise + shi:performative supplementary verb + ta:past = compromised).

Idiomatic expression; 'ga wo oru': break down one's stubborness.

Giving in, I compromised.

10. Imouto (younger sister) no sewa (care) de (particle-cause) hone (bone) ga oreta.

Idiom; hone ga oreru: take great pains.

I took great pains in taking care of my younger sister.

kudaku (smash, break sth. into pieces)

kudaku	vt	kudaita	(vt+past)
kudakeru	vi	kudaketa	(vi+past)

1. concrete vi
2. concrete vi
3. concrete vi
4. abstract vt
5. abstract vi
6. abstract vt
7. abstract vt
8. abstract vi
9. abstract vi

1. Chanwan (cup) ga yuka (floor) ni (particle place) ochite (ochiru:fall + te;connector) kudaketa.

The cup was smashed by falling on the floor.

2. Shibaraku (for a while) suru (pass, elapse) to (conjunctive particle-coordination) kaze (wind) no ikioi (force) ga kudaketa.

After a while, the force of the wind was broken.

3. Nami (waves) ga kishi (shore) ni (particle-place) kudaketa.

The waves broke on the shore.

4. Sensei (teacher) wa muzukashii (difficult) tetsugaku (philosophy) wo kudai-te (kudaku + te;connector) hanashite (hanasu:tell + te;connector) kureta (kureru;supplementary verb + ta;past marker).

The teacher broke down difficult philosophical concepts.

5. Satou-kun (Mr. Satou) no yokyou (entertainment) de (particle;means) za (atmosphere of the meeting) ga kudaketa.

Mr. Sato's entertainment broke the ice at the meeting.

6. Shiken (examination) ni (particle-object) shippaishite (shippai-suru:fail + te;connector), otouto (younger brother) wa kokoro (spirit) wo kudaita.

His failure in the examination broke the spirit of my brother. (My brother broke his spirit over the failure in the examination.)

7. Kaisha (company) no tame (benefit, sake) to (quotation particle) omoi (think), watashi (I) wa kokoro (mind, heart) wo kudai-te (kudaku + te;connector) shigoto (work) wo shi-ta (suru:do/perform + ta;past marker).

I taxed my brains for the company's benefit.

8. Ano (that) hito (person) mo (adverbial particle, too)

yo (world) no naka (centre) ni (particle-direction) dere (deru:go into) ba (conjunctive particle-subjunctive), taido (attitude, manners) ga kudakeru-darou (darou;auxiliary (conjectural)).

If he goes out into the world, he will have his corners rubbed off.

9. Kotoshi (this year) koso (adverbial particle-emphasis) wa to ((particle-quotation) shi-gatsu (April) made (adverbal particle-range, similar to 'till' in English) ganbatta (ganbaru:work hard + ta;past marker) ga (adversative conjunction,'but') go-gatsu (May) no renkyuu (a series of holidays) ni (particle-time) hairi (enter), ikigomi (enthusiasm) ga kudaketa.

I determined to do it this year. I was just getting into my stride, when the May holidays came along, which broke my concentration (or which destroyed my momentum).

Appendix 2 an analysis of 9 TL sentences

Kellerman (1977) deals with the following 9 sentences:

Literal

(1) He broke his leg.

(2) The cup broke.

(3) The wave broke on the rocks.

(4) His fall was broken by a tree.

Non-literal

(5) Since the accident, he's been a broken man.

(6) She broke his heart.

(7) He broke his word.

(8) She broke the world record.

(9) His voice broke when he was 13.

Although Kellerman deals with Dutch and English sentences, English sentences are taken up here, because a follow-up experiment is made with Japanese learners of English and Japanese sentences are discussed in the text. In the present discussion, sentences (4) & (5) are substituted by $(4)_a$ & $(5)_a$:

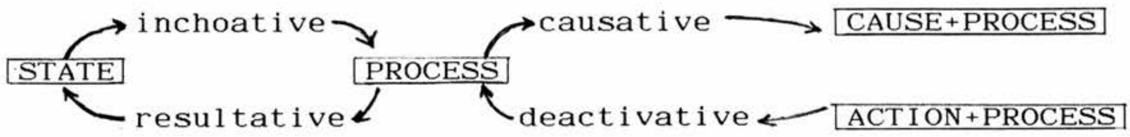
$(4)_a$ A tree broke his fall.

$(5)_a$ The accident broke his spirit.

Kellerman's sentences (4) & (5) are more natural than $(4)_a$ & $(5)_a$, but since the other sentences are all presented in the active forms, the above two exceptions are substituted for the convenience of the present discussion.

The discussion is basic and is hoped to see (1)whether the notion of the concrete/abstract continuum is plausible from a viewpoint of grammar and to study (2)what is the basic use of <u>break</u> again from the viewpoint of grammar. These two issues correspond to Kellerman's interpretation of the two dimensions in the two- or three-dimensional spaces he obtained, namely, the concrete/abstract and core/non-core dimensions.

Point (2) is discussed first. Chafe's following diagram is familiar enough. It indicates that some verbs can be converted into state, process and action-process:



Chafe, (1970:98 & 129)

We have defined the meaning of words on the basis of Rosch (see chap.3). According to her definition, every word has a basic level which has the maximal within category similarity and the minimal between category similarity. When we translate this definition into the present analysis, the basic level of break will show the larger capacity for the above derivations. That is, we assume that a set of 9 uses of break forms one category and that the more basic the word is, the more eligible it is to many transformations. The following table shows whether the above 9 sentences are liable to the above four derivations.

	State	Process	Cause+process	Action+process
(1)	+	+	+	+
(2)	+	+	+	+
(3)	-	+	-	+
(4)	-	-	+	+
(5)	+	+	+	-
(6)	+	+	+	-
(7)	-	-	+	-
(8)	+	-	+	-
(9)	-	+	-	-

Table 1

According to the above operational definition of a 'basic' level, break in sentences in (1) & (2) is more basic than the others. This accords with the definition of the basic level; the verb is maximally similar to the other uses because it possesses all the syntactic features, while the others lack in a few cells. Since we regard the 9 uses as belonging to one category and we do not have any other category in mind, we cannot say anything about minimal between-category similarity.

We will analyse the sentences, taking a few sentences at a time. Following Chafe's notational convention, we make a distinction between "intrinsic" features and "circumstantial" (contextual) features. The former is normally called 'syntactic' features. Chafe's example of what we regard as circumstantial features (which he calls an inflextional unit) is as follows. When an instrument (I) is present in the sentence with the verb 'wash', the additional meaning of "successful" is attached to the verb. Chafe represents this using the following notation:

```
         S
  _______________
  |             |        He washed his hair with shampoo.
  V             I
  action                 (intrisic feature)
______________________________________________________
  successful past        (contextual feature)
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(see Chafe,(1970: 153-6)).

Normally the verb 'wash' does not require any specific instrument. So, the sentence 'He washed his hair with shampoo' implies that with shampoo he succeded in washing his hair. Chafe appears to refer to this kind of success either after several attempts or success by improvisation. This feature comes from some such contextual implication and it is distinct from the syntactic feature of 'action'. Chafe indicates this difference by drawing a line in his notation. In the following simple analysis, 'break' is assumed to acquire other meanings which are implied by objective cases (objects which incur some damage caused by breaking).

First, we take the first three sentences of Kellerman's nine sentences.

(1) He broke his leg.

(2) The cup broke.

(3) The wave broke on the rocks.

Objective (O) in (3) is 'wave'. It is part of the nature of waves to break itself eventually even without meeting an object like rocks or shore. In this sense, 'break' in (3) has a feature [+ supervention]. For this reason, it cannot take Agent nor Instrument. Only locative can play a circumstantial role which is not a participant role. But under special circumstances, (such as one's old age or very old brittle cup) 'break' in (1) and (2) can partake of 'supervention', and this supervention in (1) and (2) belongs to the category of contextual feature.

(1) and (2)	(3)
V	V
process	process
supervention	supervention

Next, we take (1), (2) and (4).

(1) He broke his leg.

(2) The cup broke.

(4) The tree broke his fall.

O in (4) does not have features essential to the concrete sense of breaking. But (4) can take agent as its surface subject; 'He broke his fall with the tree.' But (4) cannot be transformed into the process type of sentence: *'His fall broke.' Nor can we say '*His fall was broken.' Thus, we get the result of row (4) in Table 1.

Sentence (4) has two readings: (a) the impact as a result of falling was completely reduced; (b) The process of falling was interrupted. (a) is the case of reduction of impact and (b), reduction of velocity. In (a) as the result of breaking the impact was modified but it is still an impact. Similarly, in (b) there is a change of degree in velosity but it is still a fall. There is no fixed state in the process of falling. Therefore, it may appear to be "gradable" (which is one of the syntactic features to determine whether the verb can be modified by 'adverbs of degree'), but 'break' in (4) is instantaneous.

As Kellerman classified the above four sentences into the literal cagtegory, all of these involve the physical resistence of O against the force applied to it. We can consider the following pairs.

(a) The floor broke the cup.

(His fall broke the tree.)

(b) The floor broke the cup's fall.

(The tree broke his fall.)

Before being fragmented, the cup in (a) must be falling towards the floor. Fragmenting in (a) and halting in (b) depends upon the strength of the cup and the velocity of falling in the presence of the floor. If the cup is strong enough, its fall will be arrested as in (b) and if it is not, we have the situation rendered by (a). In this sense, both in halting and fragmenting the same dimension of resistence <u>vs</u> force is in operation. Similarly, dispersion in (3) can be explained by the relationship between the resistence and the tidal force.

(1) & (2)

fragmentation: resistence < force

(3)

dispersion: resistence < force

(4)

halting: resistence > velocity

We may add a feature [+ concrete] to these four uses of 'break'.

Next, we compare sentences (1) & (2) with (5) & (6).

(1) He broke his legs.

(2) The cup broke.

(5) The accident broke him (his spirit).

(6) She broke his heart.

Apart from one possible reading for (6) [e.g., a witch literally smashed his heart], there is no resistence vs physical force relationship. (6) accompanies the experiencer (dative)'s inalienable possession, his heart. Both heart in (6) and spirit in (5) are part of the experiencer's psychological make-up. While our limbs are under the complete control of our volition, it depends on the individual whether his spirit and heart are under his control. To some extent, the case relations disambiguate the experiencer's view of how much the situation is under his control. For instance, the feature [-volition] in the word 'accident' indicates that this breaking depends as much on the experiencer's response as on this surface subject whose participant role is that of abstract locative (cause). Here, the verb appears to partake of the nature of an experiential verb, because the possessor of spirit is always dative, the recepient of the event. In this sense, the possessor himself can never function agentively. In other words, when 'break' is experiential, the possessor of spirit or heart sees the breaking as being beyond his volitional control. This suggests that 'break' in (5) & (6) is not an action verb. We might attest this, using Chafe's assumption. According to Chafe, "only non-action verbs are intrinsically experiential". He expresses this assumption as

$$\begin{array}{l} V \\ -\text{ action} \end{array} \quad \text{---->} \quad \text{experiential.}$$

The standard test for the examination for the action <u>vs</u> non-action distinction is to see whether a pseudo-cleft sentence or a progressive form is possible.

*(c) What the accdident did was to break him.

*(d) The accident is breaking his spirit.

(e) Your behaviour is breaking his spirit.

(f) She is always breaking his heart.

As Corder pointed out to me, 'break' with a progressive aspect nearly always indicates that it is iterative as in (f). (d) is not acceptable because the 'accident' implies the feature 'instantaneours' which does not accord with the meaning of progression. But (e) is acceptable, because one's behaviour is not instantaneous but habitual. This feature 'habitual' makes the progressive form semantically acceptable. In this sense, the above test did not serve our purpose of showing that 'break' in (5) & (6) is experiential by saying that they stand for non-action verbs.

The verb 'break' in (5) & (6) may be regarded as experiential, because the causative aspect of this verb involves dative or the experiencer's inalienable possession, heart or spirit. The surface subjects may vary, as in the following examples, but the presence of the experiencer's inalienable possession is normally required.

She broke his spirit.
(A)
*He broke his spirit.
(A)
He broke his spirit under the strain of the accident.
(D)
His spirit is broken.
She broke his heart.
A/I/Loc.
He broke his heart over her.
A/D I/Loc.
His heart is broken.
O/Loc

Next, we will compare again sentences (1) & (2) with (7) & (8).

(1) He broke his leg.
(2) The cup broke.
(7) He broke his word.
(8) She broke the world record.

(7) & (8) do not involve the relationship between resistence and force. So, we can classify them into the non-literal group, as in Kellerman. In (1) & (2), the objects might have been in fact smashed, chipped or cracked, but the speaker might have chosen to use 'break' rather than these alternatives. 'Break' can accept modification by 'adverbs of degree' such as 'slightly' or 'completely'. In this sense, 'break' in (1) & (2) can take the feature [+ gradable] as a contextual feature. On the other hand, this feature seems to be missing in (7) & (8). They are not liable to the modification by 'slightly' or 'greatly'.

(g) She broke the cup slightly.
(h) *She broke the world record slightly.
(i) *He broke the sound barrier slightly.

(j) *He broke his word slightly.

(k) He broke the speed limit slightly.

Sentences (h) - (k) involve some artificially established boundaries. In the case of (h) and (i), they have the feature [+ absolute boundary], as their boundaries are objectively measured and well-defined in this sense. But the cases of the last two, the boundaries are less absolute. Since the law recognizes degrees of infringement, infringement of legal limits can take such modification. In the case of breaking one's word, the boundary is a moral one. In this sense, it is less clear. But the judge, clergyman or moral philosopher would attempt to define it absolutely according to the particular context. In this sense, we can regard 'break' in (7) as having the feature [- gradable].

The feature [-gradable] in (7) & (8) may be related to the syntactic feature [-process]. They co-occur with the progressive aspect, but they are not eligible for the process sentences:

She was breaking the world record.

He was breaking his word.

*The world record broke.

*His word broke.

Finally, we discuss sentence (9) briefly.

(9) His voice broke when he was 13.

There is no clear relationship of resistence and force here. So we can regard 'break' in (9) as non-literal. 'His voice break' is ambiguous. It refers to a physical change in his voice and at the same time it implies puberty, since it is a natural process for the boy's voice to change on reaching the age of puberty. In this sense, 'break' here has the feature [+supervention]. This verb appears to involve two strands of meaning, the concrete as well as abstract processes: the physical change and puberty. Historically, this idiom is said to be derived from "The bell broke" (OED), which renders two readings: "The bell cracked" and "The note of the bell was destroyed." In this sense, similar to 'His voice broke', the original sentence also has two levels of meaning: physical change as well as musical change. Sentence (9) contrasts with an example like "His voice broke when the singer reached high ti." Here, we have the concrete meaning only.

We can summarize the above discussion and add a few features to Table 1 which emerged in the discussion.

	[+supervention]	[+ gradable]	[+experiential]
(1)	+	+	+
(2)	+	+	–
(3)	+	+	–
(4)	–	+	–
(5)	–	+	+
(6)	–	+	+
(7)	–	[+ gradable]	–
(8)	–	[+ gradable]	–
(9)	+	–	–

Table 2

In reference to Table 1 we have said (1) & (2) satisfy the definition of Rosch's basic level. The above discussion does not alter our position. But sentences (5) and (6) are also good candidates for the basic-level words. This may be the reason why both Japanese subjects and Kellerman's Dutch subjects regarded (5) and (6) as their 'sure' items in their translatability judgement tests.

Appendix 3 : The basic distinctions of Japanese verbs of destruction of destruction in their literal uses (see chap.4)

	MANNER 1					MANNER 2			
		FORCE				RESULT		Degree of Separation	
	the nature of nomiknative NP	(a)Direction	(b) ACT	(c) SCOPE (whole or part)	(d) Instrument & Incision	non-function	deformation	No.	AREA (whole or part)
kowasu (break)	[+Artefact]	ANY	ANY press {HIT ACTION} BEND	EITHER	ANY	+	+	ANY	ANY
yaburu (tear)	[+sheet]	linear	GRASP Fix pull	EITHER	HAND	±	+	M.T. 2	ANY
saku (split)	[+sheet] [+pliable]	linear	GRASP FIX pull	whole > part	HAND	±	+	M.T. 2	whole > part
chigiru (tear off)	[+pliable] [±DISCRETE ATTACHEMENT]	ANY	GRASP (FIX) pull	part	HAND	±	+	M.T. 2	part
mogitoru (pluck off)	[+DISCRETE]	ANY	GRASP pull	whole	HAND	±	N.A.	N.A.	whole
waru (crack)			{HIT BEND ACTION}	whole	± HAND ± cultlery	±	+		whole
kiru (cut)		ANY	press pull	EITHER	cutlery regular	±	+	M.T. 2	any
kaku (chip)		ANY	{HIT ACTION}	part	± HAND	±	+	M.T. 2	part
kuzusu (pull doun)	[+brittle]	{DOWNWARD Oblique}	press {HIT ACTION}	part	N.A	±	−	MANY	part > whole
kudaku (smash)	[+brittle]	DOWNWARD	press {HIT ACTION}	whole	N.A	±	+	MANY	whole >
tsubusu (crush)	[small]	DOWNWARD	press	whole	N.A	±	−	M.T. 2	ANY
oru (snap)	[+stick]		BEND	+ fulcrum	± HAND	±	−	2	ANY
mageru (bend)		{DOWNWARD UPWARD}	BEND		± HAND	±	−	NONE	ANY

M.T. : More than

Table 1

Appendix 4 Examples from school textbooks

The New Crown English Series
(3rd year junior high school)

Lesson 9

p. 64 Don't touch it because it will easily break.

_______ A little wind coming through the window may break it.

p. 68 The pupils broke the priest's vase and waited behind a shoji.

The Crown English Readers 3rd ed.
(1st year senior high school)

Lesson 3

p. 15 The waves broke the littlw ship so that it could not sail back to land.

p. 20 He had broken the laws of Japan and left the land.

Lesson 8

p. 57 When the Civil War broke out in 1861, how did things look like from the slaves' side?

Lesson 11

p. 83 "Don't fall and break a leg."

p. 86 "...., don't fall off and break your neck."

_______ "Don't break your arm,".....

Lesson 12

p. 90 I would tear down the stairs,......

p. 92 When she broke the shade a few years later she was so miserable that one would have thought the end of the world had come.

_______, Exercises

B. 4. Our hut was badly damaged by the storm.

Lesson 13

p.101 I remember when our only horse fell into a pit and broke his leg........

Lesson 7, Study

1. 9. ...Go along the right side of the building and turn to the right at the third corner.

________, Exercise

C. 2. ... futatsu me no kado wo maggatte, shimmatta rashii no desu.
(... I might have turned to the right at the second corner.)

Lesson 9, Study

1. 1 a new Japan record

________, Exercise

C. a daily schedule
research programs

Lesson 10, Study

11. 9 - 13. When rainwater freezes in cracks in the rocks, it swells and splits the hard rocks. This is the cause of split rocks. The split rocks are washed down the river, becoming smaller and smaller. They finally become pebbels or sand. Nature is certainly powerful.

________, Try A

4. What causes the huge rocks to split ?

________, Another Way to Say

2) ...it splits the hard rocks with its swelling force.

<u>Important Words and Phrases</u>

p. 61 The day broke clear and lovely.
The winter day broke dreary.

New Horison English Course
(3rd year junior high school)

Lesson 13

p. 69 Some [bottles] may break or go to places where no one can read English,...

p. 71 He walked along the beach, but found only an old shoe, a few dead fish, and a broken bottle.

Lesson 15

p. 82 Some of my dolls are ill, and some have broken their legs.

Lesson 16

p. 86 But Antonio had to promise to give Shylock a pound of his flesh ...

p. 87 I've been reading this agreement.

My English Readers
(1st year senior high school)

Lesson 8

p. 54 .....with his powerful hands Heracles broke the chains......

Lesson 10

p. 68 .....the marriage might *put a happy end to the old quarrel between the two families.

*put an end to=stop

p. 71 "How dare you come here and disturb the dead bodies of the Capulets, you villain!"

Lesson 12

p. 83 ....., when Edison was sixty-seven years old, a big fire destroyed nearly all his work.

p. 84 .....all his life's work being destroyed in this way.

Lesson 14

p.102 "....., the fish may give a sudden jerk and break the line."

p.106 ....., he struck him on the nose with the oar and it broke in his hands.

__________ "Man can be destroyed, but Man cannot be conquered."

p.107 the same as above

Appendix 1

p.110 ....

Long, long afterward, in an oak
I found the arrow, still unbroke
....

My English Readers

(2nd year senior high school)

Lesson 3

p. 15 .....the party at last *came to an end,....

*come to an end=be over

________, Word Study

p. 17 We must put an end to these accidents.

Lesson 5

p. 30 The cry was from Harry and the things falling were a lot of dolls and other things which he had upset while he was jumping over the counter.

Lesson 6

p. 35 I'm a man of my word=I keep my promise.

p. 39-40 "Yes, yes, yes," said my uncle, thoroughly confused.

Lesson 7

p. 46 .....little Wolfgang slipped and fell on the shining waxed floor of a palace,.....

Lesson 8

p. 57 In the United States, tornadoes do more damage than any other kind of windstorm.

Lesson 9

p. 64-5 This tiger immediately jumped upon him and *tore him to pieces.

*tear to pieces=break up

Lesson 10

p. 74 .....it took hundreds of years to *develop these ideas into practical inventions.

*develop sth. into .....

Lesson 12

p. 92 ...., Sam Carr,...., bending down behind the cash register,.....

p. 99 Mrs. Higgins put out her hand and touched Sam Carr's arm with an understanding gentleness, and speaking as though afraid of <u>disturbing</u> him, she said,.......

p.100 .....Sam Carr was <u>puzzled</u> by his mother,.....

p.102 .....the rumble of the train seemed to <u>break</u> the silence,......

p.104 Her face,....., a frightened, <u>broken</u> face.......

<u>My English Readers</u>
(3rd year senior high school)

Lesson 2

p. 14 Some of this music was diverted into the body of religious music that later <u>developed into</u> the Negro spiritual.

Lesson 3

p. 23 Agreements were <u>broken</u>.

p. 25 The scene he had witnessed so <u>disturbed</u> this young Indian that he went off by himself to a mountain to receive a vision.

p. 26 .....the young Indian once more saw soldiers <u>destroy</u> an Indian village........

Lesson 4

p. 41 ...., the whole plan might be <u>upset</u>.

__________ He placed it to look as if it had been <u>folded</u> to catch the eye.......

p. 43 His "Good morning" smile as the police officer was shown in the next day was at these thoughts as well as part of his carefully laid <u>plan</u>.

Lesson 5

p. 57 .....I <u>broke</u> into a wild run toward home.

p. 61 .....I let the stick fly, feeling it <u>crack</u> against a boy's skull.

p. 62 .....they <u>tore</u> out for their homes,.....

Lesson 7

p. 84 .....being without them is certainly not the end of the world, or the destruction of civilization.

The Crown English Readers 3rd ed.

(1st year senior high school)

Lesson 3

p. 15 The waves broke the littlw ship so that it could not sail back to land.

p. 20 He had broken the laws of Japan and left the land.

Lesson 8

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Lesson 12

p. 90 I would tear down the stairs,......

p. 92 When she broke the shade a few years later she was so miserable that one would have thought the end of the world had come.

_________, Exercises

B. 4. Our hut was badly damaged by the storm.

Lesson 13

p.101 I remember when our only horse fell into a pit and broke his leg........

p.102 Happily she found the bag in the bed; the cord had been worn thin by her sweat, and had broken.

_________ My mother worked with my father in the fields, trying to clear the earth of the stubborn stones.

The Crown English Readers revised ed.
(2nd year senior high school)

Lesson 2

p. 11 His once black hat became the brown color of the earth, and his clothes dusty and torn.

p. 14 His body was broken.

Lesson 7

p. 61 It is as if friendly, or unfriendly, spirits had visited us and at the break of day had suddenly disappeared......

Lesson 9, Key Points

3. a) Should an earthquake hit this city, how many buildings do you think would be destroyed?

Lesson 11

p. 90 A couple of boys had spied a nest in one of the trees and had torn it down.

________ We carried the egg home tenderly, taking care not break it and protecting its warmth.

Lesson 13

p.106-7 Leadership today requires not so much a determination to smash the other fellow as an understanding of the lessons of human experience.

A New Guide to English Composition 2
(2nd year high school)

Lesson 2, Excercise 2

B. 3. Watashi wa konda basu no naka de tokei wo kowasarete shimaimashita.
(I had my watch broken in the crowed bus.)

Lesson 5, Excercise 5

B. 3. Kare ga *yakusoku wo yabutta hazu wa arimasen.
《break one's promise》
(He cannot have broken his promise.)

Important Words and Phrases

p. 57 have one's watch broken

p. 61 a previous engagement
p. 61 break one's promise

A New Guide to English Composition 3
(3rd year high school)

Lesson 1, Exercise

B. 1. Kare wa watashi ga yakusoku wo yabutta node, watashi no koto wo okkotta.
(He was angry with me, because I broke my promise.)

B. 6 Kujikete wa ikemasen,
(Don't ge discouraged.)

Lesson 6, Study

1. 1 The day broke clear and lovely.
The day broke.

Lesson 6, Exercise

A. 1 Yuuutsuna fuyu no yoake datta.
(The winter day broke dreary.)

Lesson 7, Study

1. 9. ...Go along the right side of the building and turn to the right at the third corner.

________, Exercise

C. 2. ... futatsu me no kado wo maggatte, shimmatta rashii no desu.
(... I might have turned to the right at the second corner.)

Lesson 9, Study

1. 1 a new Japan record

________, Exercise

C. a daily schedule
research programs

Lesson 10, Study

11. 9 - 13. When rainwater freezes in cracks in the rocks, it swells and splits the hard rocks. This is the cause of split rocks. The split rocks are washed down the river, becoming smaller and smaller. They finally become pebbels or sand. Nature is certainly powerful.

________, Try A

4. What causes the huge rocks to split ?

________, Another Way to Say

2) ...it splits the hard rocks with its swelling force.

<u>Important Words and Phrases</u>

p. 61 The day broke clear and lovely.
The winter day broke dreary.

The Vista English Readers
(1st year senior high school)

Lesson 3

p. 10 He was never able to get past number three or four before he exploded.

p. 13 Though he was hot-tempered and stubborn,...

p. 14 Many of his old friends came to see him and they found that he was changed.

Lesson 4

p. 19 It's to be broken up.

Lesson 8

p. 48 I didn't want to shoot him, but I thought that perhaps I ought to do it, if his leg was broken.

p. 51 He said that at first it had not known how to run with the broken leg.

Lesson 9

p. 59 ...many changes happened in Joe Martin's life.

Lesson 10, Review and Exercises

V. 1. Sono kuni no houritsu ya kanshuu wo mamora nai to, kimi wa basse rare masu.
(If you don't follow laws and customs in the country, you will be punished.)

Lesson 11

p. 78 I smashed the case against the door, breaking the lock.

Lesson 12

p. 85 He broke the collar of his leash and rushed out at an open door.

___________ That adventure of Lobo *came to a happy end.
*come to an end=end

p. 88 In a few minutes, *he had torn **her to pieces.
*a male wolf **a female wolf

Lesson 15

p.111 Bending down, he gripped a rope's end hanging by the chair and pulled.

<u>The Vista English Readers</u>

(2nd year high school)

Lesson 3

p. 16 Dr. Hastings <u>broke</u> his leg.

p. 21 "Hastings," he said,"you got here with your <u>broken</u> leg."

Lesson 4

p. 27 But if you drop plastics of this kind onto a hard floor they often <u>break</u>, and you cannot <u>bend</u> them.

__________ Plastics of the second type can be <u>bent</u> because they are softer.

__________ They do not usually <u>break</u> even if they are dropped.

__________ They often <u>change</u> their shape, ..., if they are dropped into very hot liquids.

p. 31 Review and Exercises

II. ashi wo <u>oru</u>

(<u>break</u> one's leg)

Lesson 5

p. 35 "Nobody knows," his father snapped, ...

p. 36 <u>Puzzled</u> and a little frightened, Richard looked at his mother .....

Lesson 6

p. 45 Two weeks later a fire <u>broke out</u> in the forest.

p. 49 As he *<u>straightened up</u> from his labor, he saw two men, ...

* c.f. bend down

Lesson 7

p. 56 The answer <u>upset</u> the foreigner's plan.

Lesson 8

p. 67 .....," Osborn <u>snapped</u> at him.

__________ It was very cold, but the wind had <u>fallen</u>.

Lesson 8

p. 70 There was a flash of steel in the sunlight, and a bent figure leaped from the snow to the rock shelf.

Lesson 10

p. 86 To where *it bent in the undergrowth; ....
*road

Lesson 11

p. 91 When we sat down by the fire, he bent forward and spoke ....

Lesson 13

p.104 He had a way of bending backwards from the knees as if about to get under a wire fence, ...

___________ They crushed into a huge theatre, ...

p.105 Suddenly, ...,trying to tear off scraps of the clothing of their idol, ...

p.110 My bicycle broke down .....

Lesson 14

p.116 .....the tempo at which we live is not affected by the tempo at which we tear about.

The Vista English Readers

(3rd year senior high school)

Lesson 1

p. 1 There was one thing which seemed out of place in his sitting room---an old cracked cup on top of a chest of drawers.

Lesson 7

p. 46 He was greeted with cold disdain by the manager of the station, who told him that his boat had broken down .....

p. 50 At least he had started out his career in Africa with some ideals, even if they had ultimately *gone to pieces.

*go to pieces=break up

Lesson 8

p. 60 Eva stared up at him, thoroughly confused.

Lesson 9

p. 69 It's like resuming an interrupted conversation with the advantage of being able to pick up where you left off.

Lesson 10

p. 74 ......, I asked for a boy or man to come and chop wood for the fireplace.

p. 75 He wore overalls and a torn shirt,.....

p. 77 The next day he came again after school and split kindling......

Lesson 11

p. 82 I did not know why it disturbed me.

Lesson 13

p.106 We reached bottom as the tower started to crumble.

__________ The monster crashed upon the tower.

__________ The tower was destroyed.

__________ First, a great sucking of air, and then the lament, the bewilderment, the loneliness of the great monster, folded over and upon us, so that the reek of its body filled the air.

p.107 The only thing was a faint odor from the slimy green matter that covered the fallen tower stones.

Lesson 14

p.113 Break that glass and chaos would follow.

p.114 .....even a few small bombs could break so many links in the intricater chain of technology,.....

p.117 .....if these machines happened to be destroyed.

Appendix 5: the definitions of inductive and projective limits

When we regard the Thurstone-Torgerson method as essentially derived from the bivariate normal distribution function, we can define the present method of evaluating the judgemental limits as the "inductive" and "projective" limits. Thurstone's simplified method of evaluation also accords with these definitions. I follow the definitions of inductive and projective limits proposed by Takeuti (1978). Takeuti explains them in terms of the mathematical theory of "Category". This branch of mathematics is powerful in showing the interrelationship among the various mathematical areas. The theory of Category can reveal the system within the systems and objects in a Category cover a singleton set, sets, Abel group etc. Since the system of a language contains heteroneous objects (e.g., language requires various norms or metrics (see chap.9)), in translating such objects into mathematical entities, we find the theory of Category to be useful.

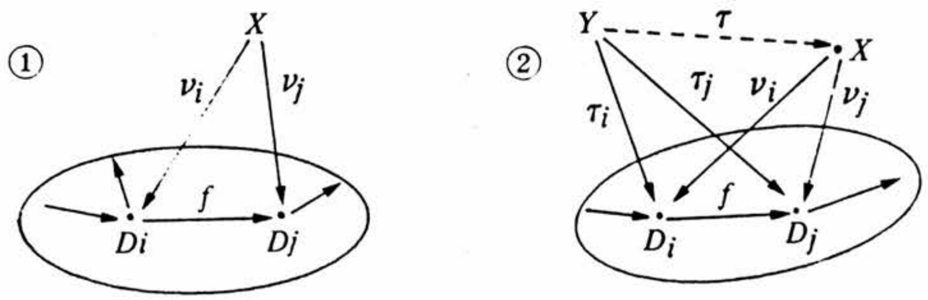
We assume here that a set of NL items forms a Category C and that a smaller set of translatability judgements forms C's sub-category D. According to Takeuti (1978: 60-61). The inductive limit ($X = \varinjlim D$) is defined as follows. X in Category C is an inductive limit for its subcategory D, when the following two conditions are satisfied.

Condition (1): The situation depicted by diagram ① must be commutative.

$$f \in D \land f : D_i \longrightarrow D_j \Longrightarrow \nu_j = f \circ \nu_i$$

Condition (2): In diagram ②, we suppose that Y is an object in C and that τ_i is a morphism representing (τ_i : Y $\rightarrow D_j$). When (τ_j = ($f \circ \tau_i$) holds with respect to $f \in D$ ($f: D_i \rightarrow D_j$), $\tau(\tau: Y \rightarrow X)$ can be uniquely determined such that we get

$$\tau_i = \nu_i \circ \tau$$



Inductive limit ($X = \varinjlim D$)

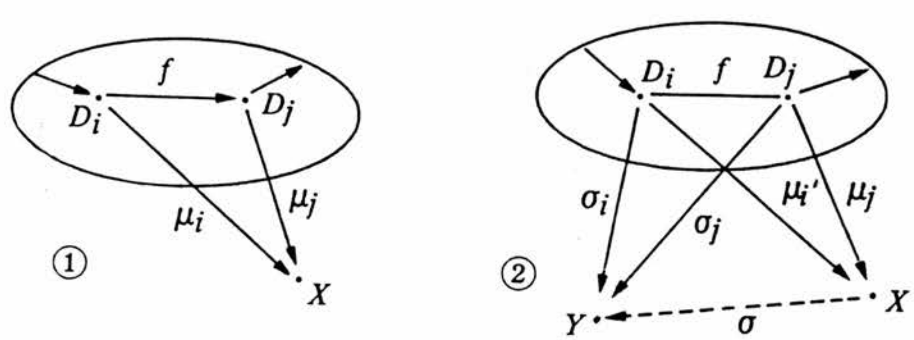
On the other hand, when the following two conditions are met, X in C is defined as colimit (projective limit) and we write $X = \varprojlim D$.

Condition (1): The situation depicted by diagram ① is commutative.

$$f \in D \wedge f : D_i \longrightarrow D_j \Longrightarrow \mu_i = \mu_j \circ f$$

Condition (2): We suppose that Y in diagram ② below is an object in C and that σ_i is a morphism denoting (σ'_i: $D_i \to Y$). If σ_i can be expresed by the composition of ($\sigma_i \circ f$), σ(σ':$X \to Y$) can be uniquely determinded such that we get

$$\sigma_i = \sigma \circ \mu_i$$



Colimit (X = lim D)

In YAC3 and KOC3, the subjects were instructed that one of the NL items was translatable. We supposed that they would induce the judgemental limit according to this initial instruction. Our instruction means in the present framework that one object in Category C corresponds to one object in Category D. Thus, <u>identity</u> (coded as id_{D_0} on Diagram 1) is experimentally established between D and C. Thurstone 's method of evaluation is to work with only the <u>adjacent</u> pairs of stimuli (see chap.7). This meant in practice that we started with arranging X-matrix (see chap.7) in the order of increasing magnitudes.

> Stimulus A is contrasted with stimulus B. (The semantically closest pair is extimated first.) Then, stimulus B is paired with stimulus C and so on.

We can summarises the above experimental situation as follows:

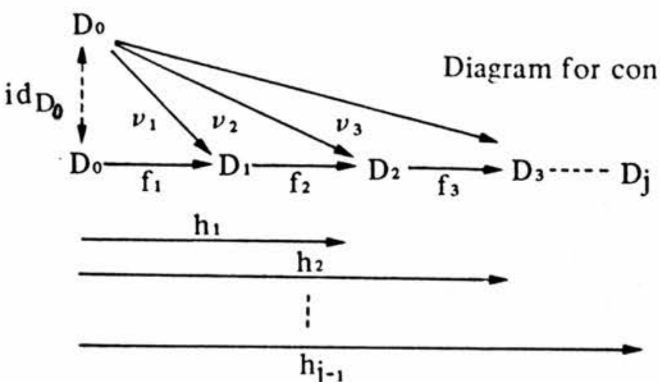


Diagram for condition ② for $D_0 = \varinjlim D$

Diagram for condition ① in the case of $D_0 = \varinjlim D$

D_j is ordered according to the similarity to D_0.

f_j (similarity function)

ν_j (transferability function)

$j = \{1,2,\ldots.,9\}$ in <u>yaburu</u>.

$j = \{1,2,\ldots,10\}$ in <u>kowasu</u>.

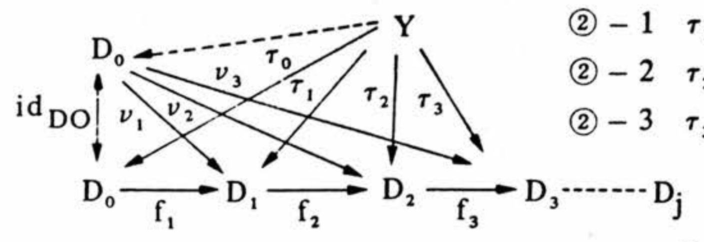
① − 1	$\nu_1 = f_1 \circ id_{D_0}$	$\therefore \nu_1 = f_1$
① − 2	$\nu_2 = f_2 \circ \nu_1$	$\therefore f_2 \circ f_1 = h_1 \ (= \nu_2)$
① − 3	$\nu_3 = f_3 \circ \nu_2$	$\therefore f_3 \circ h_1 = h_2 \ (= \nu_3)$
	$\vdots$	$\vdots$
	$\nu_j = f_j \circ \nu_j$	$\therefore f_j \circ h_{j-2} = h_{j-1} \ (= \nu_j)$

Diagram 1

As we have seen in chap.7, Thurstone's method involved the simplifying assumption that the first SV is assumed to reflect a standard normal distribution function N(0,1) and that the first SV is thus zero with DD,1. This means in Diagram 1 that $\nu_1 = f_1$. The translatability function ν_2 for D_2 reflects the distance between D_0 and D_2 and the translatability function $_3$ for D_3 reflects the distance between D_0 and D_2, and so forth. This is our experimental rationale. That is, we have hypothesized that the experimental 'sure' item D_0 would determine the members of sub-Category D (a set of translatable items). In this sense, our experimental rationale accorded with the notion of inductive limit with respect to condition (1) above. After we examine whether our experimental rationale is in keeping with the other condition (2) above, we will look at whether the method of evaluation under the assumption of bivariate normal distribution function accords with the definition of inductive limit.

Condition (2) in terms of the present experimental rationale is represented in Diagram 2. We have supplied one Japanese item Y in Category C as translatable. We have asked the subjects to use Y as clue to judge the translatabilities of D_1, D_2, ... The equations given on the right top corner in Diagram 2 indicate that when the antecedents are satisfied, the consequents follow accordingly. Since we have seen that condition (1) is met, the rest of the equations in Diagram 2 to satisfy condition (2) holds naturally.

Diagram for condition ② for $D_0 = \underset{\rightarrow}{\lim} D$



②−1 $\tau_1 = f_1 \circ \tau_0 \Rightarrow \tau_1 = \mathrm{id}_{DO} \circ \tau$

②−2 $\tau_2 = f_2 \circ \tau_1 \Rightarrow \tau_1 = \nu_1 \circ \tau$

②−3 $\tau_3 = f_3 \circ \tau_2 \Rightarrow \tau_2 = \nu_2 \circ \tau$

$\vdots \qquad \vdots$

$\tau_j = f_j \circ \tau_{j-1} \Rightarrow \tau_{j-1} = \nu_j \circ \tau$

$\because \tau_0 : Y \rightarrow D_0$

$f_1 : D_0 \rightarrow D_1$

$f_1 \cdot \tau_0 : Y \rightarrow D_1$

$\tau : Y \rightarrow D_1$

$\therefore \tau_1 = f_1 \circ \tau_0$ etc.

$\tau : Y \rightarrow D_0$

$\mathrm{id}_{DO} : D_0 \rightarrow D_0$

$\mathrm{id}_{DO} \circ \tau : Y \rightarrow D_0$

$\tau_0 : Y \rightarrow D_0$

$\therefore \tau_0 = \mathrm{id}_{DO} \circ \tau$ etc.

$\therefore \tau_0 = \tau$

From ①−1

$\nu_1 = f_1$

$\nu_1 \cdot \tau = f_1 \circ \tau_0 = \tau_1$ (②−2)

From ②−1

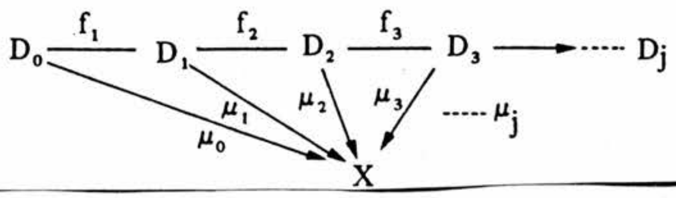
$\nu_2 = f_2 \circ f_1 = h_1$

$\nu_2 \cdot \tau = h_1 \circ \tau_0 = \tau_2$ (②−3) etc.

Diagram 2

So far we have seen that the experimental rationale is in keeping with the definition of inductive limit. We can now examine whether the method of evaluating the judgemental limit accords with the definition of inductive limit. Diagram 3 represents conditions (1) & (2).

Diagram for condition ① for $X = \varinjlim D$

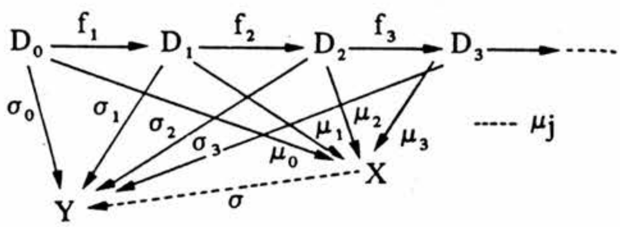


$$\mu_0 = \mu_1 \circ f_1$$
$$\mu_1 = \mu_2 \circ f_2$$
$$\mu_3 = \mu_2 \circ f_2$$
$$\vdots \qquad \vdots$$
$$\mu_j = \mu_{j-1} \circ f_j$$

$j = \{1,2,....,9\}$ <u>yaburu</u>

$j = \{1,2,...,10\}$ <u>kowasu</u>

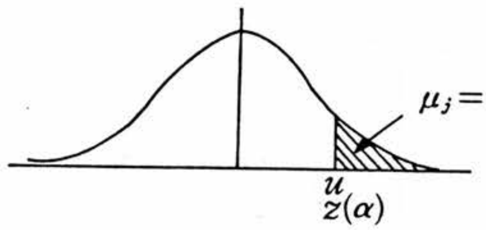
Diagram for condition ② $X = \varinjlim D$



$$\sigma_0 = \sigma_1 \circ f_1 \Rightarrow \sigma_0 = \sigma \circ \mu_0$$
$$\sigma_1 = \sigma_2 \circ f_2 \Rightarrow \sigma_1 = \sigma \circ \mu_1$$
$$\sigma_2 = \sigma_3 \circ f_3 \Rightarrow \sigma_2 = \sigma \circ \mu_2$$
$$\vdots \qquad \vdots$$
$$\sigma_{j-1} = \sigma_j \circ f_j \Rightarrow \sigma_{j-1} = \sigma \circ \mu_j$$

Diagram 3

On the basis of the proportion of people who chose D_j against D_{j-1} [(where $D_j \geq D_{j-1}$; $\geq$ stanted for the similarity continuum D_0 at one extreme, i.e., D_j is more similar to D_0 than D_{j-1})], the unit normal deviate is computed. The unit normal deviate is assumed to correspond to the deviation from the mean sense valure in standard units. This means, simply, that we need to compute $(z(\alpha))$ and (u) independently; and we assume the two values are equal. The main idea behind this procedure is that the subjects' similarity judgements reflect translatability (i.e., analogical process) and that if a judgemental limit (x) falls in the area (1- (u)), then x is selected at random:



$$\mu_j = 1 - \Phi(u) = \frac{1}{\sqrt{2\pi}} \int_u^\infty e^{-x^2/2} dx$$

Thus, $\Phi(u) = \Phi(z(\alpha)) = \Phi(\alpha) \circ z(\alpha)$

Diagram 4

Therefore, condition (1) is satisfied by our experimental situation.

The method of estimating the judgemental limit satisfies condition (2) of the inductive limit. Once we can establish $_0 = {}_1 \ f_1 \text{ -- } {}_0 = \ \mu_0$, the rest of the equations above follows naturally. So, only the first equation is dealt with here. Recall that $\mu_0 = \mu_1 \ f_1$ which is established in condition (1), where μ_1 denotes a bivariate normal distribution function ($f(x_1,x_2)$) with two variables D_1 and X. The bivariate normal distribution function has the following relationship with the margianl density function for x_1 and that for x_2 (see chap.7):

$$\frac{\partial}{\partial x_2}\frac{\partial}{\partial x_1}F(x_1, x_2) = \int_{-\infty}^{x1}\int_{-\infty}^{x2} f(t_1, t_2)dt_2 dt_1$$

$= f(x_1, x_2)$……bivariate normal distribution function

$$\frac{\partial}{\partial x_1}F(x_1, x_2) = \int_{-\infty}^{x2} f(x_1, t_2)dt_2$$

$= f_1(x_1)$……marginal density function for x_1

$$\frac{\partial}{\partial x_2}F(x_1, x_2) = \int_{-\infty}^{x1} f(t_1, x_2)dt_1$$

$= f_2(x_2)$……marginal density function for x_2

$\therefore \quad f_1(x_1) = f(x_1, x_2) \circ f_2(x_2) \quad f_2(x_2) = f(x_1, x_2) \circ f_1(x_1)$

(This is another way of explaining $\mu_0 = \mu_1 \circ f_1$.)

The same would hold, when three morphisms in Diagram 3 stand for the respective functions noted in parentheses.

σ_0 (marginal density function for Y)

σ_1 (bivariate normal distribution function with two variables D_1 & Y)

f_1 (marginal density function for D_1)

$\therefore\ \sigma_0=\sigma_1\circ f_1$ Similarly. $\sigma_{j-1}=\sigma_j\circ f_j$

Thus, the antecedent of condition (2) is satisfied. As for the consequent, we can argue similarly. Since σ_0 is a marginal density function for Y and σ_0 is a marginal density function for X, σ can be uniquely determined by the bivariate normal distribution function with two variables X and Y.

$\sigma_0 = \sigma \circ \mu_0$ Likewise, $\sigma_j = \sigma \circ \mu_j$

Thus, the condition (2) may be regarded as compatible with our rationale over and above our statistics.

Having seen that our experimental analysis is congruous with the necessary and sufficient conditions to determine whether X is $\underrightarrow{\lim}$ D, the judgemental limit estimated in the manner described above can be regarded as denoting the inductive limit ($\underrightarrow{\lim}$ D). In terms of statistical analysis X stands for the upper limit in the integral of standardized normal distribution function with respect to the subjects' estimation of translatability. However, it can be characterized as the inductive limit as shown above.

The judgemental limit induced in trial 1 can be characterized as a "projective limit" for the trivial reason.

$$\begin{tikzcd}
D_0 \arrow[r] \arrow[d] \arrow[rrd] & D_1 \arrow[r] \arrow[ld] \arrow[rd] & D_2 \arrow[r] \arrow[d] \arrow[lld] & {} \\
Y & & X \arrow[ll, dashed]
\end{tikzcd}$$

X uniquely determines Y.

Diagram 5

X is an experimental 'sure' item belonging to Category C. The subjects were asked to judge the translatability of the remainder of the NL list so that D_2, D_1 and D_0 form a subcategory D (a set of translatability judgements) in the mind of the subject. $D_0 = \varprojlim D$ must be used in the process. Otherwise, the subjects could not evaluate the other NL item Y as traslatable.

You have a list of sentences arranged in a random order and a blank sheet of paper. Read the list carefully several times.

<u>Task 1</u>

Group the sentences according to the similarity of meanings of the verb. You may make any number of groups. Write down how you grouped the sentences on the blank sheet of paper -- you can use the letters given.

<u>Task 2</u>

In each of your groups, pick the two sentences which you think are most similar to each other. Write down the pair you have chosen and connect them with a line. Next, rate their similarity on the 5-point scale.

1 --- identical
2 --- closely related
3 --- some relationship
4 --- slight relationship
5 --- totally different

E.g.,

a--2--f

Then, among the remaining sentences pick the sentence which you think is most similar to either of the two sentences you have already selected as most similar. Write this sentence down on your paper and connect it to the appropriate sentence already selected. Rate the similarity between them on the 5-point scale, as you have done with the first pair, e.g.,

d--3--a--2--f

Proceed in exactly the same way until you exhaust the sentences in each group. Please check whether you have joined all the sentences in each group and rated the similarity on the 5-point scale, e.g.,

d--3--a--2--f
c--4--g
e--1--h--4--c etc.

<u>Task 3</u>

Now that you have made the sentences into several groups, try to find the two sentences in two separate groups that are more similar to each other than any other sentences in the same groups. Connect these sentences and rate their similarity using the 5-point scale. Proceed in exactly the same way until all the separate lines are rated according to the 5-point scale, e.g.,

d--3--a--2--f
c--4--g 4 4
e--1--h--4--c

d--3--a--2--f
c--3--g 4
e--1--h--4--c

1.1 Frequency data

Kowasu

No.	obj.noun	consistent	variable
4	cup	12	2
8	umbrella	10	3
1	plan	7	5
2	arranged marriage	5	3
3	abdomen	0	1
5	body(health)	0	0
6	negotiation	6	4
7	mood(man)	0	1
9	dream	5	3

Table 1

Yaburu

No.	obj.noun	consistent	variable
3	skirt	3	4
5	umbrella	10	5
6	silence	8	3
1	rule	9	4
2	heart	6	1
4	world record	7	2
8	promise	10	5
7	dream	4	1
9	plan	7	2

Table 2

Kudaku

No.	obj.noun	consistent	variable
4	cup	9	6
1	manners	0	1
2	spirit	3	3
3	wind	2	2
5	concentration	0	1
6	waves	8	4
7	atmosphere	0	0
8	philosophy	0	0
9	heart and mind	3	2

Table 3

Oru

No.	obj.noun	consistent	variable
4	leg	11	3
10	umbrella	11	4
7	arm	4	3
6	pride	3	2
9	conversation	2	2
2	ego	0	1
3	corner of the page	0	0
5	crane	0	0
8	road	0	0
1	pains	0	0

Table 4

Kowasu

	1	2	3	4
2	1.105			
3	3.5	2.81		
4	1.59	2.25	2.4533	
5	2.085	1.99	-0.975	2.465
6	1.0025	0.3767	(x2)	2.2467
7	1.84	3.15	2.1367	3.23
8	2.23	2.66	2.51	0.02
9	1.2525	1.5425	0.41	2.2467

	5	6	7	8
6	3.09			
7	0.9167	1.8867		
8	2.5567	2.3933	3.09	
9	2.1067	1.2475	1.91	2.445

0 0.84 1.84 2.66

Table 1

Yaburu

	1			
2	2.42	2		
3	2.235	2.66	3	
4	1.6467	3.26	2.57	4
5	2.775	1.8033	1.28	2.65
6	1.95	0.7925	2.41	2.485
7	2.235	2.57	2.745	2.235
8	-0.615	2.19	2.72	2.095
9	1.4675	1.79	(x1)	1.72

	5			
6	1.995	6		
7	2.29	2.36	7	
8	2.595	2.595	2.545	8
9	2.595	2.57	2.485	0.94

0	0.95	1.75	2.72

Table 2

Kudaku

	1			
2	2.855	2		
3	2.63	3.88	3	
4	2.24	1.9233	2.0667	4
5	2.24	2.0167	1.95	2.64
6	2.91	2.4067	1.4667	1.175
7	0.655	1.745	2.4467	(x3)
8	2.3633	(x1)	2.15	2.1
9	2.1	1.24	3.88	2.705

	5			
6	2.915	6		
7	2.075	2.37	7	
8	(x2)	2.37	2.0667	8
9	2.705	3.19	2.855	2.845

0	0.89	1.83	2.91

Table 3

Oru

	1				
2	0.9075	2			
3	1.66	2.09	3		
4	1.42	2.09	1.0167	4	
5	(x1)	(x2)	0.0733	1.3033	
6	1.03	0.725	(x2)	1.42	
7	(x3)	1.65	1.535	0.3167	
8	2.52	1.66	1.825	2.09	
9	1.81	1.905	1.23	1.9	
10	(x2)	1.955	1.783	0.0267	
	5				
6	(x0)	6			
7	1.86	1.955	7		
8	1.13	2.52	1.2667	8	
9	(x0)	0.9333	1.7333	1.66	9
10	1.365	2.52	0.8825	(x2)	(x1)

0	0.475	1.221	2.079

x0 : 0 frequency

x1 : 1 frequency

x2 : 2 frequencies

Table 4

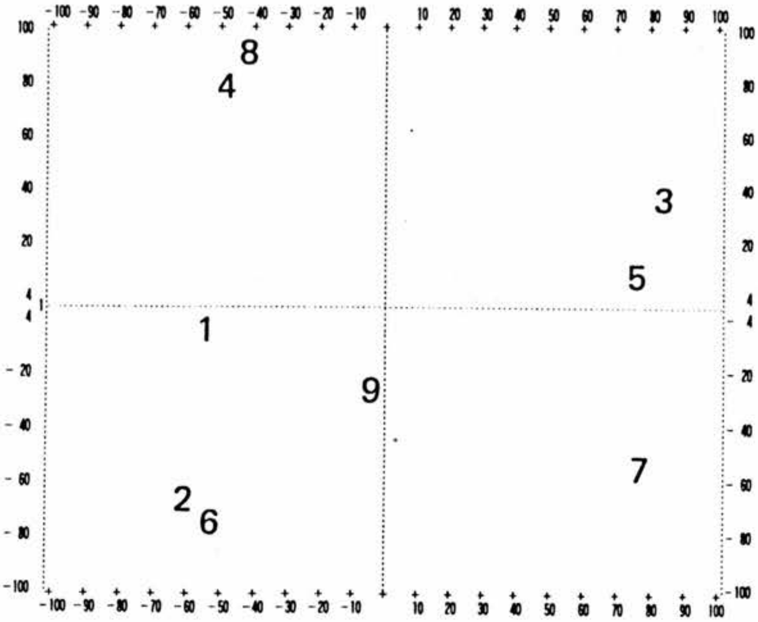
Kowasu

1. Mr. Nakata's sudden visit upset (disturbed) my plan.
   中田さんの突然の訪問で計画がこわれた。
2. His daughter's arranged marriage fell through and the father was worried.
   娘の縁談がこわれたので父親がこまった。
3. Over-eating upset my stomach.
   食べすぎで腹をこわした。
4. The cup broke.
   コップがこわれた。
5. The accident broke his health & since then he has been an invalid.
   あの事故以来彼は体をこわしている。
6. Because of Mr. Yamada, negotiations were broken off.
   山田さんのせいで，交渉がこわれた。
7. My tactless remark seems to have upset (disturbed) my brother.
   私が余計なことをいったので兄は気分をこわしたようだ。
8. The umbrella broke.
   傘がこわれた。
9. My father's illness put an end to my dream of going to Britain.
   父の病気で渡英の夢がこわれた。

Kowasu

FINAL CONFIGURATION

	1	2
1	−0.6334	−0.0858
2	−0.7055	−0.7447
3	1.0518	0.4282
4	−0.5603	0.9437
5	0.9462	0.1723
6	−0.6014	−0.8526
7	0.9642	−0.6764
8	−0.4577	1.1500
9	−0.0040	−0.3347
MEAN	−0.0000	−0.0000
SIGMA	0.7238	0.6900



DISTANCES (MDS-SIM)

	1	2	3	4	5	6	7	8
2	0.6628							
3	1.7619	2.1128						
4	1.0321	1.6946	1.6925					
5	1.6006	1.8892	0.2769	1.6925				
6	0.7675	0.1500	2.0913	1.7967	1.8562			
7	1.7033	1.6712	1.1081	2.2246	0.8489	1.5755		
8	1.2483	1.9108	1.6732	0.2305	1.7108	2.0078	2.3146	
9	0.6768	0.8125	1.3027	1.3942	1.0771	0.7906	1.0268	1.5525

KOWASU

Fig. 1

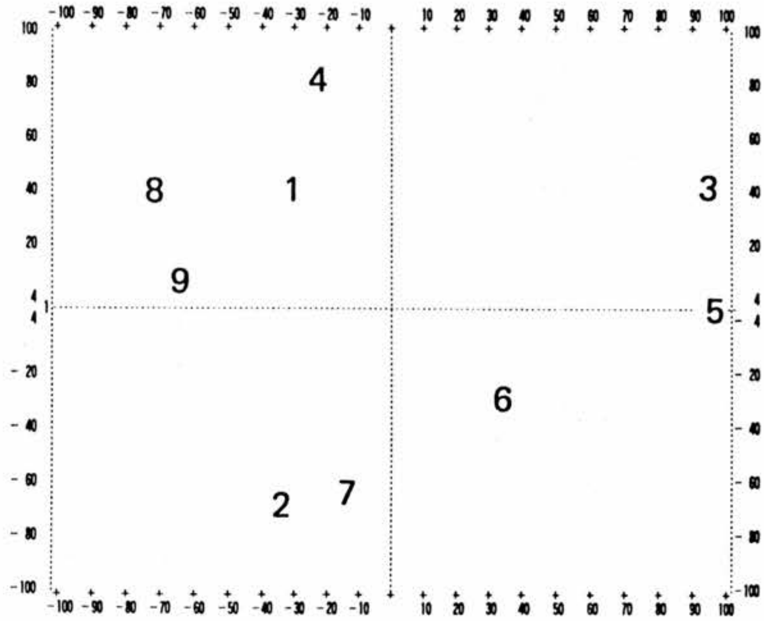
Yaburu

1. Mr. Harada broke the rule.
   原田さんは規則をやぶった。
2. Namiko broke my heart.
   浪子さんは僕の恋心をやぶった。
3. I tore my skirt.
   スカートをやぶった。
4. Smith broke the world record.
   スミスが世界記録をやぶった。
5. I tore my umbrella.
   かさをやぶった。
6. The thunder & lightening broke the silence.
   落雷が沈黙をやぶった。
7. My father's illness shattered (put an end to) my dream of going to Britain.
   父の病気で渡英の夢がやぶられた。
8. Mr. Yamada broke his promise.
   山田さんは約束をやぶった。
9. Changing my plan, I decided to spend Sunday in bed.
   計画をやぶって，日曜日はねていることにした。

Yaburu

FINAL CONFIGURATION

	1	2
1	−0.4234	0.4223
2	−0.4052	−0.9587
3	1.1949	0.5538
4	−0.2718	0.9375
5	1.3096	−0.0951
6	0.5491	−0.3722
7	−0.1364	−0.9379
8	−0.9279	0.3935
9	−0.8888	0.0568
MEAN	−0.0000	0.0000
SIGMA	0.7840	0.6208



DISTANCES (MDS-SIM)

	1	2	3	4	5	6	7	8
2	1.3812							
3	1.6236	2.2019						
4	0.5370	1.9009	1.5181					
5	1.8086	1.9200	0.6590	1.8887				
6	1.2558	1.1201	1.1290	1.5457	0.8095			
7	1.3902	0.2696	1.9995	1.8803	1.6738	0.8888		
8	0.5054	1.4498	2.1289	0.8523	2.2903	1.6637	1.5490	
9	0.5918	1.1248	2.1421	1.0753	2.2037	1.5005	1.2472	0.3390

YABURU

Fig. 2

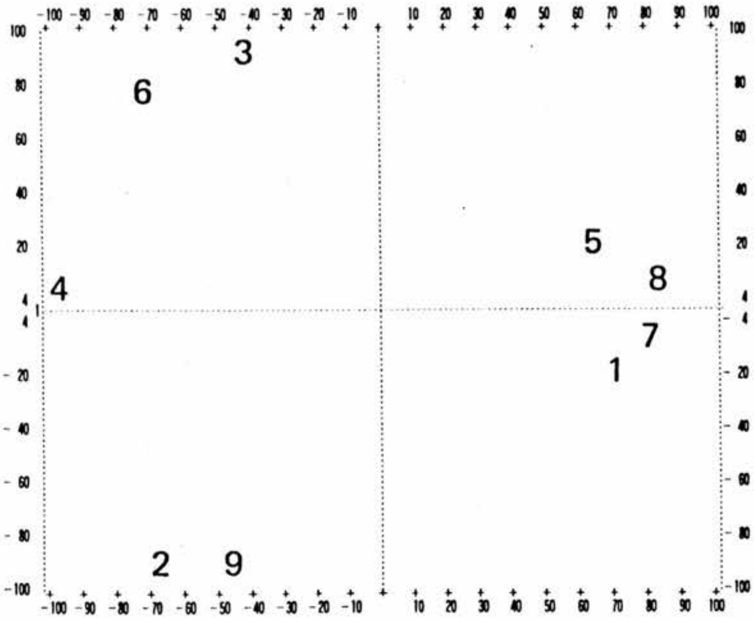
Kudaku

1. If he goes out into the world, he will have his corners rubbed off.
   あの人も世の中に出れば態度がくだけてくるだろう。
2. His failure in the exam broke my brother's spirit.
   試験に失敗して弟は心をくだいた。
3. After a while the force of the wind was broken.
   しばらくすると風の勢いがくだけた。
4. The up fell on the floor & was smashed.
   床におちて，カップがくだけた。
5. I determined to do it this year. I was just getting into my stride, but the May holidays disturbed my enthusiasm.
   今年こそはと思っていたが，５月の連休で意気込みがくだけた。
6. The waves broke on the shore.
   波が岸にくだけた。
7. Mr. Sato's joke broke the ice at the meeting.
   佐藤君の冗談で座がくだけた。
8. The teacher broke down the difficult philosophical concepts.
   先生はむづかしい哲学をくだいて話した。
9. I taxed my brains for the company's benefit.
   会社のために心をくだいて仕事をした。

Kudaku

FINAL CONFIGURATION

	1	2
1	0.7753	−0.1881
2	−0.6711	−0.9769
3	−0.4095	1.0265
4	−1.0149	0.0676
5	0.7139	0.1885
6	−0.7404	0.8614
7	0.8940	−0.0883
8	0.9143	0.1092
9	−0.4616	−0.9998
$\overline{M}$	−0.0000	−0.0000
Σ	0.7568	0.6536



DISTANCES (MDS-SIM)

	1	2	3	4	5	6	7	8
2	1.6475							
3	1.6967	2.0204						
4	1.8083	1.0996	1.1340					
5	0.3815	1.8100	1.4015	1.7329				
6	1.8436	1.8397	0.3698	0.8400	1.6024			
7	0.1551	1.7997	1.7152	1.9152	0.3303	1.8903		
8	0.3281	1.9217	1.6106	1.9296	0.2156	1.8177	0.1983	
9	1.4795	0.2107	2.0269	1.2022	1.6714	1.8820	1.6335	1.7672

KUDAKU

Fig. 3

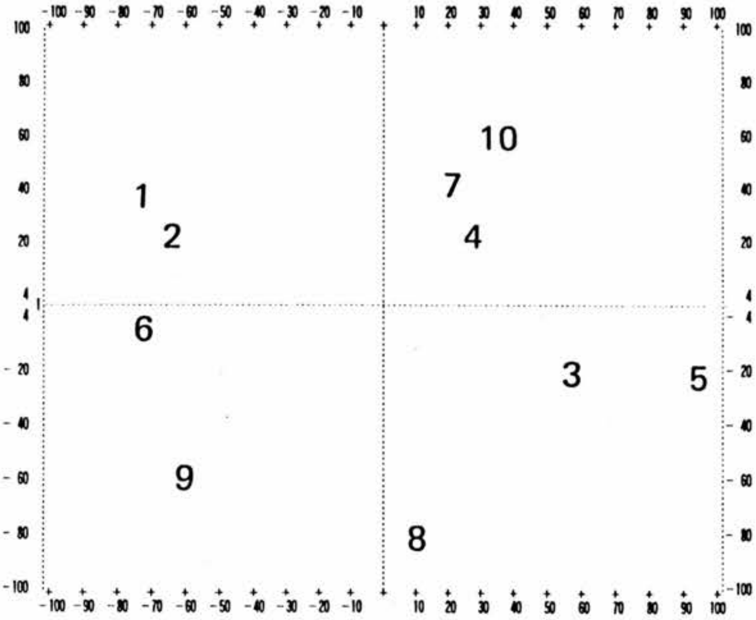
Oru

1. I took great pains in taking care of my younger sister.
妹の世話で骨がおれた。
2. I gave in & compromised.
我をおって妥協した。
3. The corner of a page is turned down.
ページのすみがおれている。
4. I fell and broke my leg.
ころんで足をおった。
5. My sister is quietly folding a piece of paper into a crane.
妹は静かにツルをおっている。
6. Since he was so boastful, I decided to put him in his place (broke his pride).
あまり自慢するので鼻をおってやった。
7. I bent and stretched my arm over & over again.
うでをおったりのばしたりした。
8. The road bends to the right towards the sea.
道は右におれて海にでる。
9. Mr. Mizuno has a habit of breaking into other people's conversation.
水野くんは人の話のこしをおるくせがある。
10. The stem of an umbrella was bent.
かさのえがおれた。

Oru

FINAL CONFIGURATION

	1	2
1	−0.9433	0.4942
2	−0.8700	0.2777
3	0.7750	−0.3150
4	0.3976	0.3448
5	1.3775	−0.3363
6	−0.9816	−0.0871
7	0.3333	0.5981
8	0.1504	−1.0628
9	−0.7819	−0.8349
10	0.5430	0.9213
M	0.0000	0.0000
Σ	0.7941	0.6077



DISTANCES (MDS-SIM)

	1	2	3	4	5	6	7	8	9
2	0.2286								
3	1.8993	1.7486							
4	1.3493	1.2694	0.7600						
5	2.4650	2.3299	0.6029	1.1934					
6	0.5826	0.3815	1.7713	1.4453	2.3722				
7	1.2808	1.2452	1.0143	0.2614	1.4013	1.4827			
8	1.9028	1.6847	0.9743	1.4291	1.4260	1.4945	1.6709		
9	1.3389	1.1161	1.6415	1.6683	2.2163	0.7740	1.8158	0.9598	
10	1.5465	1.5527	1.2578	0.5946	1.5093	1.8279	0.3853	2.0226	2.2000

ORU

Fig. 4

2.0 Pilot study (2) (see chap.5)

Kowasu

	junior	high	univ.
house	1 (rank)	2	6
vehicles	2	14	15.5
glass	3	7	4.5
chair	4	23	2.5
vase	5	3	9
rice bowl	6	10.5	10
cup	7.5	5	8
bridge	7.5	17.5	67
dream	9.5	10.5	29
TV set	9.5	52	12.5

Table 2

Yaburu

	junior	high	univ.
paper	1	1	1
clothes	2	2	4
shoji[1]	3	3	2
notes	4.5	5	6
promise	4.5	4	3
book	6	6	6
cloth	7.5	7	9
dream	7.5	8	16.5
membrane	10	/	8
rule[2]	10	9	10
record	10	18.5	11.5

Table 3

Kowasu

junior		high school		university	
items	frequency	item	frequency	item	frequency
house[2]	41 (51%)	building	34 (34.1%)	watch	40 (34.5%)
vehicles	20 (25)	house	32 (26.2)	desk	36 (31.6)
glass	20 (25)	vase	29 (23.8)	chair	36 "
desk	19 (23.8)	toy	26 (21.3)	toy	33 (28.4)
chair	14 (17.5)	cup	19 (15.6)	glass	33 "
vase	13 (16.3)	wall	18 (14.8)	house	31 (26.7)
rice bowl	11 (13.8)	glass	15 (12.3)	building	29 (25)
cup	10 (12.5)	watch	11 (9)	cup	23 (19.8)
bridge	10 "	plate	11 "	vase	22 (19)
dream	9 (11.25)	rice bowl	10 (8.2)	rice bowl	21 (18.1)
TV	9 "	dream	10 "	machine	20 (17.2)
umbrella	8 (10)	desk	9 (7.4)	plates	14 (12.1)
stomach	8 "	mountain	9 "	TV	14 "
window	7 (8.8)			building blocks	12 (10.3)
radio	7 "			radio	11 (9.5)
friendship	6 (7.5)			vehicles	11 "
bottle	6 "			bicycle	10 (8.6)
watch	6 "			doll	9 (7.8)
				propelling-pencil	9 "

Table 4

Kowasu

	junior	high	university
8-frequency item	2 words	1 word	1 word
7-frequency item	2	2	8
6-frequency item	3	2	1
5-frequency item	2	2	3
4-frequency item	4	5	8
3-frequency item	6	12	12
2-frequency item	23	29	31
1-frequency item	44	54	99

Table 5

Yaburu

junior		high		university	
items	frequency %	items	frequency %	items	frequency %
paper	56 (70.0)	paper	86 (70.5)	paper	90 (77.6)
clothes	31 (38.8)	clothes	46 (37.7)	shoji	50 (43.1)
shoji	29 (36.3)	shoji	38 (31.1)	promise	25 (21.6)
note	15 (18.8)	promise	36 (29.5)	clothes	19 (16.4)
promise	15 "	note	35 (28.7)	fusuma 9	18 (15.5)
book	12 (15.0)	book	27 (22.1)	note	18 "
cloth	11 (13.8)	cloth	19 (15.6)	book	18 "
dream	11 "	dream	14 (11.5)	membrane	15 (12.9)
membrane	8 (10)	rule$_2$	11 (9)	cloth	13 (11.2)
rule$_2$ 4	8 "	bag	9 (7.4)	rule$_2$	12 (10.3)
record	8 "	skirt	9 "		
		curtain	9 "		

Table 6

	junior	high	univ.
11-frequency item	2	1	0
10 "	0	0	0
9 "	0	3	0
8 "	3	0	2
7 "	0	0	0
6 "	1	3	3
5 "	2	2	2
4 "	7	2	4
3 "	5	3	6
2 "	21	20	30
1 "	40	50	54

Table 7

[1] *Shoji* stands for a set of four sliding doors whose frames are made of wood. The parts which correspond to glass panes in an ordinary window are covered with strong but semi-transparent paper. These doors are seen in most Japanese houses.

[2] *Ie* is translated as either house or home. According to the subjective familiarity ratings, this word is rated 1 (very familiar) by most subjects. But several subjects rated it as 6 or 7 (very rare). The contrast between these ratings suggests that one rating is based on the literal use (representing 'house'), and the other extreme ratings, on the metaphorical use (representing 'home'). There is another lexical item which is usually translated as 'home' in English, ie., *katei*.

[3] *Fusuma* is a set of 2 or 4 sliding doors. It is often paper-covered.

[4] 'Rule$_2$ is a translation of *kisoku*. *Kimari* is a more colloquial word and this is translated as rule$_1$. The latter applies to such expressions as school rules or the 'rule' of language [*kotoba* (language) *no* (of) *kimari* (rule)]

Kowasu 2-frequency words

items	junior	high	university
		rating	
scale model	(3,2)	(3,4)	(5,2)
ornament	(4,3)	(2,5)	(3,4)
tōfu	(3,1)	(5,4)	(6,5)
abdomen	(5,3)	(2,5)	(4,5)
shoulder	(3,4)	(4,3)	(2,4)
physical condition	(5,4)	(2,5)	(4,6)
humour[1]	(1,4)	(6,2)	(1,4)
hope	(4,5)	(5,6)	(4,4)
project	(3,1)	(3,5)	(1,7)
negotions	(3,3)	(2,3)	(2,4)
establishment	(4,1)	(5,3)	(3,4)
box	(4,2)		
savings box	(1,1)		
bowl	(1,2)		
stereo	(7,3)		
chōshi[2]	(4,1)		
form	(1,1)		
biru[3]	(4,4)		
lavatory	(7,7)		
to	(1,1)		(1,4)
door	(1,2)		(3,1)
downtown	(6,7)		
stone	(5,7)		
tools		(1,1)	
umbrella		(1,1)	
TVset		(1,2)	
proppelled pencil		(2,3)	
tableware		(1,1)	(1,1)
boat		(6,5)	
car		(1,4)	
mirror		(5,1)	
egg		(5,4)	
concrete blocks		(2,2)	
globe		(7,3)	
bank		(3,4)	
love$_3$[4]		(3,7)	
heart$_1$[5]		(6,7)	
ideal		(3,4)	
future		(6,4)	
akogare[6]		(4,4)	
briefcase			(3,2)
furniture			(2,6)
glass			(1,1)
jar			(3,1)
washing machine			(2,1)
stove			(2,3)
electricity			(7,7)
gate			(7,1)
roof			(2,1)
windowpane			(4,3)
mountain			(3,3)
bridge			(1,1)
belly			(4,5)

plan	(1,7)
love$_2$	(1,7)
love$_4$	(7,7)
electric light	(2,6)

Table 8

Notes:

1. *Kibun* refers to either or both physical condition and feelings. It is similar to mood in English, but mood stresses feelings. Thus, it is translated as humour.

2. *Chōshi* refers to pitch, tone, swing and stride. When this word cooccurs with *kowasu*, it can be translated as breaking the rhythm (of one's work) or one's stride.

3. *Biru* originates from the Enblish word "building". It refers to large buildings.

4. There are many words which are associated with the English word "love". The following 4 items were produced by the subjects:

love$_1$	(*ai*)	≒ love
love$_2$	(*danjo no naka*)	≒ adult love
love$_3$	(*koi*)	≒ young love
love$_4$	(*naka*)	≒ love, intimacy or friendship

5. The subjects produced two words which can be both translated as "heart":

heart$_1$	(*kokoro*)	: heart, mind & spirit
heart$_2$	(*koigokoro*)	: similar to young love but suggestive of aspirations and yearnings to a specific individual.

6. "*Akogare*" is normally translated as longings, aspiration and yearning. This use is not confind to aspecific individual. It covers any life style and a general aim in life.

Yaburu

items	junior	high	university
		rating	
bank note	(7,1)	(5,2)	(5,6)
stocking[7]	(3,6)	(4,3)	(2,2)
silence	(4,1)	(6,2)	(7,4)
atmosphere	(6,3)	(3,5)	(4,7)
heart$_2$	(3,7)	(3,7)	(5,6)
friendship	(2,5)	(1,4)	(3,4)
hope	(1,5)	(4,6)	(4,4)
expectation	(1,5)	(1,5)	(2,5)
peace	(1,7)	(2,7)	(3,6)
agreement	(1,7)	(3,2)	(3,4)
constitutional law$_1$[8]	(3,4)	(5,3)	(3,6)
drawing paper	(3,1)		
paper	(1,2)		
newspaper	(2,1)		
drapes	(7,4)	(5,1)	
patch[9]	(4,5)	(6,1)	
sock	(1,2)		
leaf	(4,4)		
quietness	(5,3)		
law$_2$	(3,1)		(1,5)
law$_3$	(3,1)		
glass		(7,4)	(2,5)
net		(1,1)	
women's stocking		(1,1)	
handkerchief		(3,1)	(2,4)
eardrum		(2,7)	
giant[10]		(2,7)	
hesitation		(3,1)	
examination paper			(2,1)
dictionary			(2,1)
photograph			(3,4)
ticket			(5,2)
tissues			(2,3)
curtain			(5,1)
<u>kimono</u>			(1,4)
top			(,1)
bladder tissue			(2,3)
<u>to</u>			(4,5)
door			(4,4)
window			(5,5)
tough enemy (lit.)			(4,6)
leather			(7,2)
rule$_2$			(1,5)
love$_3$			(2,5)

Table 9

Notes:

7. <u>Kutsushita</u> (stocking) is distinct from a borrowed word "suttokkingu". The former is a general term for stockings and socks. The latter is used for women's stockings.

8. The subjects produced several lexical items which are associated with law, rule and regulations:

law$_1$	(*hōritsu*)	:	constituional law
law$_2$	(*hōsoku*)	:	natural law (eg., law of gravitation)
law$_3$	(*hō*)	:	jurisprudence or justice
rule$_1$	(*kimari*)	:	as in school rules, traffic rules
rule$_2$	(*kisoku*)	:	rule or regulation and *kisoku* is more formal than *kimari*.
rule$_3$	(*okite*)	:	the rigorous rules of conventional behaviours
	(*kitei*)	:	regulations
	(*hōki*)	:	constitutional laws and regulations
	(*kairitsu*)	:	commandments

9. The word "kire" is normally translated as "patch", but in the dialect the subjects use it can mean cloth as well. Here it is interpreted as "patch" rather than cloth (*nuno*).

10. The name of the popular professional baseball team.

Kowasu (junior high school)

5-frequency word

omocha	(toy)
puramoderu	(scale model)

4-frequency word

sara	(plate)
jitensha	(bicycle)
fudebako	(pencil case)
karada	(body)

3-frequency word

uekibachi	(flowerpot)
kikai	(machine)
tamago	(egg)
mūdo	(mood)
tatemono	(building)
yane	(roof)

Table 10

<u>Kowasu</u> (junior high school)

1-frequency words

1. huusen (balloon)
2. tansu (chest of drawers)
3. kutsu (shoes)
4. sandaru (sandals)
5. <u>geta</u>
6. gurasu (glass)
7. sekizou (stone image)
8. kokuban (black-board)
9. piano (piano)
10. gitaa (guitar)
11. chakku (zipper)
12. haizara (ash tray)
13. raketto (racket)
14. jidousha (car)
15. hune (ship)
16. enpitsu (pencil)
17. pen (pen)
18. mannenhitsu (fountain pen)
19. shaapen (propelling pencil)
20. suisou (water tank)
21. megane (glasses)
22. kagami (mirror)
23. shitajiki (pad)
24. keshigomu (eraser)
25. senpuuki (electric fan)
26. supiikaa (speaker)
27. denki (electricity)
28. katei (home)
29. katachi (shape)
30. shintai (body)
31. oto (sound)
32. muudo (mood/atmosphere)
33. <u>shouji</u> (paper sliding door)
34. madogarasu (pane)
35. douro (road)
36. yama (mountain)
37. dotei (bank)
38. uchuu (universe)
39. chikyuu (the earth)
40. kousha (school building)
41. kawara (tile)
42. shizen (nature)
43. inugoya (doghouse)
44. hanashi (talk)
45. endan (marriage proposal)

Table 11

Kowasu (high school)

8-frequency word		**4-frequency word**	
kuruma	(vehicles)	isu	(chair)
		hako	(box)
7-frequency word		bin	(bottle)
tsumiki	(blocks)	biru	(building)
yūjō	(friendship)	to	(door)
6-frequency word		**3-frequency word**	
jidōsha	(car)	mono	(things)
hashi	(bridge)	ningyō	(doll)
		tsubo	(vase)
5-frequency word		megane	(spectacles)
kikai	(machine)	katei	(home)
ai	(love)	hei	(fence)
		mado	(window)
		madogarasu	(window pane)
		ishi	(stone)
		sunayama	(sand)
		karada	(body)
		naka	(relationship)

Table 12

kowasu (senior high school)

1-frequency words

1. chokinbako (saving box)
2. huusen (balloon)
3. heyapin (hairpin)
4. burouchi (brooch)
5. omamori (amulet)
6. kutsu (shoes)
7. keshigomu (eraser)
8. kamera (camera)
9. keikoutou(fluorescent light)
10. denkyuu (electric bulb)
11. kagu (furniture)
12. kaban (bag)
13. hon (book)
14. mannenhitsu (fountain pen)
15. utsuwa (vessel)
16. sutereo (stereo)
17. touki (earthenware/china)
18. kame (earthen pot)
19. garasuzaiku (glass work)
20. gurasu (glass)
21. koya (hut/shed)
22. shiro (castle)
23. yane (roof)
14. tobira (door)
25. uchyuu (universe)'
26. iwa (rock)
27. nendo (clay)
28. michi (way)
29. juukyo (residence)
30. gakkou (school)
31. doa (door)
32. damu (dam)
33. toride (fort/stronghold)
34. atama (head)
35. kao (face)
36. okane (money)
37. satsu (bank-note)
38. hyakuendama(100-yen coin)
39. yonmanen (40,ooo yen)
40. retsu (line/row)
41. endan (marriage proposal)
42. imeiji (image)
43. keikaku (plan)
44. riron (theory)
45. kenryoku (power/authority)
46. chikyuu (the earth)
47. shakai (society)
48. hokori (pride)
49. shinrai (trust/reliance)
50. puraido (pride)
51. jinkaku (personality/character)
52. omoide (memories)
53. genjitsu (actuality)
54. machi (town)
55. katachi (shape)

Table 13

Kowasu (university)

8-frequency word

bin	(bottle)

7-frequency word

hako	(box)
fudebako	(pencil case)
sutereo	(stereo)
biru	(building)
kabe	(wall)
mado	(window)
imēji	(image)
megane	(spectacles)

6-frequency word

yume	(dream)

5-frequency word

karada	(body)
yūjō	(friendship)
tēburu	(table)

3-frequency word

mishin	(sewing machine)
gakkō	(school)
kamera	(camera)
reizōko	(refrigerator)
kūrā	(air conditioner)
kagami	(mirro)
kutsu	(shoes)
gakki	(musical instruments)
piano	(piano)
burokkubei	(wall made of concrete blocks)

4-frequency word

kowarenaimono	(unbreakable)
mannenhitsu	(fountain pen)
bōrupen	(ball-pointed pen)
shintai	(body)
endan	(marriage arrangement)
burokku	(block)
raketto	(racket)
jidōsha	(car)
pen	(pen)

Table 14

kowasu (university)

1-frequency words

1. waremono (fragile article)
2. tsukuttamono (product)
3. kasa (umbrella)
4. hondana (book shelf)
5. kobako (small box)
6. ohashi (chopsticks)
7. obon (tray)
8. touki (china)
9. tansu (chest of drawers)
10. beddo (bed)
11. kagi (key/lock)
12. kokuban (blackboard)
13. chokinbako (saving box)
14. puramoderu (plastic model)
15. e (picture)
16. nuigurumi(stuffed doll)
17. nekkuresu (necklace)
18. beruto (belt)
19. kushi (comb)
20. hangaa (hanger)
21. bouru (ball)
22. kurarinetto (clarinet)
23. baiorin (violin)
24. hachi (bowl)
25. U.F.O.
26. enpitsu (pencil)
27. shitajiki (pad)
28. keiki (cake)
29. tamago (egg)
30. soujiki (vacuum cleaner)
31. kotatsu
32. densha (electric train)
33. kisha (train)
34. hune (ship)
35. ootobai (motorcycle)
36. senpuuki (electric fan)
37. kuuraa (cooler)
38. denkisutando (desk lamp)
39. denwa (telephone)
40. denkiseihin (electric apparatus)
41. kasetto (cassette)
42. teipurekoudaa (taperecorder)
43. pureiyaa (player)
44. dekki (deck)
45. supiikaa (speaker)
46. handoru (handle)
47. bureiki (brake)
48. enjin (engine)
49. meitaa (meter)
50. kankisen (ventilator)
51. denkikamisori(electric shaver)
52. rekoudo (record/disk)
53. katei (home)
54. shiro (castle)
55. tou (tower)
56. kakine (fence)
57. tana (shelf)
58. gake (clif)
59. teibou (bank)
60. michi (way)
61. yukidaruma (snowman)
62. kadan (flower bed)
63. niwa (garden)
64. shabondama (soap bubble)
65. sunanoshiro (sand castle)
66. todana (cupboard/closet)
67. yane (roof)
68. ishi (stone)
69. tsuki (the moon)
70. mise (shop/store)

Table 15-1

71. apaato (apartment)
72. depaato (department store)
73. <u>husuma</u>
74. heya (room)
75. hashira (pillar)
76. doubutsuen (zoo)
77. hana (flower)
78. kousha (school building)
79. kaidan (stairs)
80. inugoya (doghouse)
81. seishin (spirit)
82. ashi (foot)
83. hiza (knee)
84. hiji (elbow)
85. te (hand)
86. me (eye)
87. huchi (edge)
88. nippon (Japan)
89. chikyuu (the earth)
90. iseki (remains/ruins)
91. atama (head)
92. risou (ideal)
93. kizuna (bond/tie)
94. ai (love)
95. shoudan (business talk)
96. hanashi (talk)
97. jibun (self)
98. ketsugou (union/combination)
99. ningenkankei (human relationship)

Table 15-2

<u>4-frequency word</u>		<u>3-frequency word</u>	
fukuro	(bag)	pantsu	(under pants)
tesuto	(test)	shojomaku	(hymen)
osatsu	(bank-note)	mūdo	(mood)
kāten	(curtain)	koi	(affection)
zubon	(trousers)	nozomi	(hope)
kasa	(umbrella)		
kaban	(briefcase)		

Table 16

<u>yaburu</u> (junior high school)

1-frequency words

1.	kyoukasho	(textbook)	36.	mato	(target/mark/object)
2.	shashin	(photograph)	37.	kimari	(rules)
3.	raburetaa	(lover-letter)	38.	renai	(romantic love)
4.	hagaki	(post-card)	39.	kokoro	(mind/heart)
5.	tegami	(letter)	40.	souzou	(imagination)
6.	posutaa	(poster)			
7.	harigami	(poster)			
8.	<u>origami</u>				
9.	shorui	(documents/papers)			
10.	chirigami	(toilet paper/tissue)			
11.	ie	(house/family)			
12.	youhuku	(Western clothes)			
13.	seihuku	(uniform)			
14.	<u>kimono</u>				
15.	shatsu	(shirt)			
16.	biniiru	(vinyl)			
17.	houtai	(bandage)			
18.	teipu	(tape)			
19.	zoukin	(dustcloth)			
20.	ami	(net)			
21.	chokki	(waistcoat/vest)			
22.	zukku	(canvas shoes)			
23.	boushi	(hat/cap)			
24.	uwagi	(outerwear)			
25.	sukaato	(skirt)			
26.	komaku	(tympanum)			
27.	kawa	(skin)			
28.	i	(stomach)			
29.	garasu	(glass)			
30.	chikaku	(crust)			
31.	jimen	(surface of land)			
32.	kyouteki	(powerful enemy)			
33.	aite	(companion/partner/opponent/rival)			
34.	teki	(enemy)			
35.	shiai	(match/game)			

Table 17

8-frequency word		5-frequency word	
none		burausu	(blouse)
		kabe	(wall)

7-frequency word		4-frequency word	
none		chirigami	(tissue paper)
		kiroku	(record)

6-frequency word		3-frequency word	
shinbun	(newspaper)	zubon	(trousers)
tegami	(letter)	nairon	(nylon)
fusuma	(<u>fusuma</u>)	kimono	(<u>kimono</u>)

Table 18

yaburu (senior high school)

1-frequency words

1. zasshi (magazine)
2. zaragami (rough paper)
3. youshi (form)
4. hyoushi (cover)
5. harigami (poster)
6. huutou (envelope)
7. kitte (stamp)
8. touan (answer sheet)
9. tesuto (test)
10. tesutoyoushi (test paper)
11. tsuuchihyou (school results)
12. kamihuusen (paper balloon)
13. origami (folding paper)
14. memoyoushi (memo pad)
15. kamibukuro (paper bag)
16. irogami (coloured paper)
17. toirettopeipaa (toilet paper)
18. keiyakusho (contract)
19. seikyuusho (bill)
20. shoujou (certificate)
21. katagami (pattern)
22. hanshi (rice paper)
23. kingyoshukuiage (paper net for goldfish)
24. tako (kite)
25. tento (tent)
26. huroshiki (wrapping cloth)
27. kawa (leather)
28. kawa (skin)
29. kutsu (shoes)
30. juutan (carpet)
31. doubutsunokara (animal's shell)
32. hane (feather)
33. happa (leaf)
34. moumaku (retina)
35. teibou (embarkment)
36. toride (fort)
37. teki (enemy)
38. aite (opponent)
39. raibaru (rival)
40. shizukesa (stillness)
41. jouyaku (treaty)
42. kyoukai (boundary)
43. shuchou (assertion)
44. sakuryaku (trick)
45. kimari (rule)
46. kijun (standard)
47. jikan (time)
48. joushiki (common sense)
49. shinrai (trust)
50. chikai (oath)

Table 19

8-frequency word

tegami	(letter)
kiroku	(record)

7-frequency word

none

6-frequency word

5-frequency word

kyōkasho	(textbook)
yume	(dream)

4-frequency word

shinbun	(newspaper)
shinbunshi	(newspaper sheet)
fukuro	(bag)
teki	(enemy)

3-frequency word

shorui	(papers)
kire	(cloth)
zubon	(trousers)
tento	(tent)
shojomaku	(hymen)
kitei	(regulation)

Table 20

<u>yaburu</u> (university)

1-frequency words

1. denwachou (telephone directory)
2. nikki (diary)
3. techou (pocket book)
4. e (drawing)
5. housoushi (wrapping paper)
6. karendaa (calendar)
7. peepaa (paper)
8. kamikoppu (paper cup)
9. toirettopeepaa (toilet paper)
10. serohanshi (cellophane paper)
11. peiji (page)
12. doresu (dress)
13. sukaato (skirt)
14. shatsu (shirt)
15. kasa (umbrella)
16. biniiru (vinyl)
17. uwagi (uppers)
18. kingyosukuinoami (paper net for catching goldfish)
19. tenjou (ceiling)
20. ita (wooden plank)
21. ha (leaf)
22. seijaku (quietude)
23. shizukesa (stillness)
24. kabe (wall)
25. waku (frame)
26. bougyo (protection)
27. mikata (ally)
28. kaapu (Carp)
29. kyojin (Giant)
30. kutsu (shoes)
31. tebukuro (gloves)
32. kumo (cloud)
33. kontakutorenzu (contact lenses)
34. kiritsu (regulation)
35. shoumon (bond)
36. keiyaku (contract)
37. aijoukankei (love affairs)
38. kankei (relationship)
39. kokoro (heart$_1$)
40. ishi (will)
41. chiimuwaaku (team work)
42. shinkou (intimacy)
43. kousai (company)
44. ikigai (raison d'être)
45. shugi (principles)
46. mentsu (face)
47. tabuu (taboo)
48. kin (prohibition)
49. chitsujo (order)
50. nozomi (hope)
51. houki (laws & regulations)
52. housoku (law$_2$)
53. kimari (rule$_1$)
54. kairitsu (commandment)

Table 21

2.1 Pilot study (2) (see §5.2)

5-point scale

1st trial

sen. / subj.	a	b	c	d	e	f	g
1	3	4	2	4	5	1	4
2	5	4	4	4	5	1	5
3	5	4	4	4	5	2	5
4	5	4	2	2	3	1	3
5	5	4	2	2	4	1	3
6	3	4	5	4	2	1	5
7	5	4	3	5	5	1	5
8	5	4	4	4	5	1	4
9	5	4	4	4	5	1	4
10	5	5	5	5	5	3	5
11	5	4	4	3	5	1	3
12	5	3	2	2	4	1	2
13	5	3	3	3	5	1	2
14	5	3	2	2	5	1	2
15	4	3	2	3	4	1	4
16	4	3	2	3	4	1	3
17	5	3	3	3	5	1	2
18	5	3	3	3	5	1	4
19	5	2	3	3	4	1	3
20	5	4	4	4	3	1	4
21	5	3	2	3	5	1	4
22	3	2	1	1	2	1	1
23	5	4	4	5	4	1	4
24	4	3	2	2	3	1	2
25	3	3	3	3	4	1	3

2nd trial

sen. / subj.	a	b	c	d	e	f	g
1	3	4	3	4	5	1	3
2	5	4	4	4	5	1	1
3	4	4	4	4	4	2	4
4	5	3	3	2	4	1	4
5	4	2	4	2	4	1	2
6	3	3	4	4	2	1	5
7	5	5	5	5	5	2	5
8	5	5	4	4	4	1	4
9	5	3	3	4	3	1	5
10	5	5	4	5	5	2	5
11	5	3	3	3	4	1	4
12	4	3	3	3	4	1	3
13	4	3	3	3	2	1	3
14	5	3	3	3	4	1	3
15	3	4	2	4	4	1	3
16	4	4	3	3	3	1	3
17	5	4	3	4	5	1	1
18	5	2	3	3	4	1	3
19	5	3	3	3	4	1	3
20	4	3	3	3	4	1	3
21	5	3	4	3	5	1	4
22	4	4	3	2	3	1	3
23	4	4	4	4	4	1	4
24	4	4	4	2	4	1	3
25	2	5	3	3	4	1	3

<u>5-point scale</u>

	3rd trial								4th trial							
sen. subj.	a	b	c	d	e	f	g	sen. subj.	a	b	c	d	e	f	g	r_s
1	3	5	2	5	7	1	5	1	3	5.5	3	5.5	7	1	3	0.8932
2	6	3	3	3	6	1	6	2	6.5	4	4	4	6.5	1.5	1.5	0.5103
3	6	3	3	3	6	1	6	3	4.5	4.5	4.5	4.5	4.5	1	4.5	0.6614
4	7	6	2.5	2.5	4.5	1	4.5	4	7	3.5	3.5	2	5.5	1	5.5	0.8241
5	7	5.5	2.5	2.5	5.5	1	4	5	5	3	5	3	5	1	3	0.5696
6	3	4.5	6.5	4.5	2	1	6.5	6	3.5	3.5	5.5	5.5	2	1	7	0.9352
7	5.5	3	2	5.5	5.5	1	5.5	7	4.5	4.5	4.5	4.5	4.5	1	4.5	0.7004
8	6.5	3.5	3.5	3.5	6.5	1	3.5	8	6.5	6.5	3.5	3.5	3.5	1	3.5	0.8000
9	6.5	3.5	3.5	3.5	6.5	1	3.5	9	6.5	3	3	3	5	1	6.5	0.7514
10	4.5	4.5	4.5	4.5	4.5	1	4.5	10	5	5	2	5	5	1	5	0.7636
11	6.5	4.5	4.5	2.5	6.5	1	2.5	11	7	3	3	3	5.5	1	5.5	0.7117
12	7	5	3	3	6	1	3	12	6.5	3.5	3.5	3.5	6.5	1	3.5	0.9303
13	6.5	4	4	4	6.5	1	2	13	7	4.5	4.5	4.5	2	1	4.5	0.4335
14	6.5	5	3	3	6.5	1	3	14	7	3.5	3.5	3.5	6	1	3.5	0.9290
15	6	3.5	2	3.5	6	1	6	15	3.5	6	2	6	6	1	3.5	0.4444
16	6.5	4	2	4	6.5	1	4	16	6.5	6.5	3.5	3.5	3.5	1	3.5	0.6627
17	6.5	4	4	4	6.5	1	2	17	6.5	4.5	3	4.5	6.5	1.5	1.5	0.9709
18	6.5	3	3	3	6.5	1	5	18	7	2	4	4	6	1	4	0.9126
19	7	2	4	4	6	1	4	19	7	3.5	3.5	3.5	6	1	3.5	0.9405
20	7	4.5	4.5	4.5	2	1	4.5	20	6.5	3.5	3.5	3.5	6.5	1	3.5	0.4451
21	6.5	3.5	2	3.5	6.5	1	5	21	6.5	2.5	4.5	2.5	6.5	1	4.5	0.9159
22	7	5.5	2.5	2.5	5.5	2.5	2.5	22	6.5	6.5	4	2	4	1	4	0.7882
23	6.5	3.5	3.5	6.5	3.5	1	3.5	23	4.5	4.5	4.5	4.5	4.5	1	4.5	0.8133
24	7	5.5	3	3	5.5	1	3	24	5.5	5.5	5.5	2	5.5	1	3	0.8051
25	4	4	4	4	7	1	4	25	2	7	4	4	6	1	4	0.6702

9-point scale

1st trial

sen. / subj.	a	b	c	d	e	f	g
1	6	8	6	7	8	1	6
2	9	8	9	8	8	2	9
3	9	9	8	8	8	2	9
4	9	7	2	3	6	1	4
5	9	8	7	5	5	1	3
6	5	8	9	6	3	1	9
7	9	9	8	9	9	2	9
8	9	8	7	8	9	1	8
9	9	8	8	8	9	1	8
10	9	9	9	9	9	4	9
11	9	7	7	4	8	2	4
12	8	4	3	3	7	2	3
13	8	5	5	5	9	2	4
14	9	6	4	4	9	1	4
15	8	7	6	8	8	1	6
16	8	6	5	5	6	1	6
17	9	5	5	5	9	1	7
18	9	6	5	5	9	1	4
19	9	3	5	4	7	1	4
20	9	8	7	7	7	1	7
21	9	7	4	7	9	1	8
22	5	5	4	3	3	1	3
23	8	8	8	9	7	1	8
24	6	6	5	4	4	1	3
25	4	5	4	6	7	1	4

2nd trial

sen. / subj.	a	b	c	d	e	f	g
1	4	7	6	7	9	1	7
2	9	8	8	3	7	1	2
3	7	8	8	8	8	2	8
4	9	6	4	3	8	1	4
5	4	4	4	4	6	1	4
6	5	8	7	8	4	1	9
7	9	9	9	9	9	2	9
8	9	8	6	7	8	1	7
9	9	8	7	7	8	1	7
10	8	8	6	7	9	2	8
11	8	6	3	6	7	1	6
12	8	4	4	4	5	2	4
13	7	6	5	5	8	2	4
14	9	4	5	5	8	1	4
15	8	8	7	8	7	1	6
16	8	7	4	5	5	1	5
17	9	5	5	5	9	1	1
18	9	3	5	4	7	1	4
19	9	4	5	5	8	1	4
20	9	4	5	5	8	1	4
21	9	6	5	6	8	3	9
22	7	7	6	6	4	1	4
23	7	7	8	8	7	1	9
24	7	7	7	4	4	1	4
25	4	4	4	5	7	1	4

<u>9-point scale</u>

	3rd trial								4th trial							
sen.	a	b	c	d	e	f	g	sen.	a	b	c	d	e	f	g	r_s
subj.								subj.								
1	3	6.5	3	5	6.5	1	3	1	2	5	3	5	7	1	5	0.8544
2	6	3	6	3	3	1	6	2	7	5.5	5.5	3	4	1	2	0.4866
3	6	6	3	3	3	1	6	3	2	5	5	5	5	1	5	0.3127
4	7	6	2	3	5	1	4	4	7	5	3.5	2	6	1	3.5	0.9009
5	7	6	5	3.5	3.5	1	2	5	4	4	4	4	7	1	4	0.3146
6	3	5	6.5	4	2	1	6.5	6	3	5.5	4	5.5	2	1	7	0.8364
7	5	5	2	5	5	1	5	7	4.5	4.5	4.5	4.5	4.5	1	4.5	0.7640
8	6.5	4	2	4	6.5	1	4	8	7	5.5	2	3.5	5.5	1	3.5	0.9242
9	6.5	3.5	3.5	3.5	6.5	1	3.5	9	7	5.5	3	3	5.5	1	3	0.8779
10	4.5	4.5	4.5	4.5	4.5	1	4.5	10	5	5	2	3	7	1	5	0.6354
11	7	4.5	4.5	6	2.5	1	2.5	11	7	4	2	4	6	1	4	0.5283
12	7	5	3	3	6	1	3	12	7	3.5	3.5	3.5	6	1	3.5	0.9405
13	6	4	4	4	7	1	2	13	6	5	3.5	3.5	7	1	2	0.9770
14	6.5	5	3	3	6.5	1	3	14	7	2.5	4.5	4.5	6	1	2.5	0.7813
15	6	4	2.5	6	6	1	2.5	15	6	6	3.5	6	3.5	1	2	0.6111
16	7	5	2.5	2.5	5	1	5	16	7	6	2	4	4	1	4	0.8932
17	6.5	3	3	3	6.5	1	5	17	6.5	4	4	4	6.5	1.5	1.5	0.6981
18	6.5	5	3.5	3.5	6.5	1	2	18	7	2	5	3.5	6	1	3.5	0.7798
19	7	2	5	3.5	6	1	3.5	19	7	2.5	4.5	4.5	6	1	2.5	0.9587
20	7	6	3.5	3.5	3.5	1	3.5	20	7	2.5	4.5	4.5	6	1	2.5	0.6722
21	6.5	3.5	2	3.5	6.5	1	5	21	6.5	3.5	2	3.5	5	1	6.5	0.9167
22	6.5	6.5	5	3	3	1	3	22	6.5	6.5	4.5	4.5	2.5	1	2.5	0.9425
23	4.5	4.5	4.5	7	2	1	4.5	23	3	3	5.5	5.5	3	1	7	0.6916
24	6.5	6.5	5	3.5	3.5	1	2	24	6	6	6	3	3	1	3	0.9232
25	3	5	3	6	7	1	3	25	3.5	3.5	3.5	6	7	1	3.5	0.9405

Subject	5Tg	9Tg
1	0.8932	0.8544
2	0.5103	0.4866
3	0.6614	0.3127
4	0.8241	0.9009
5	0.5696	0.3146
6	0.9352	0.8364
7	0.7004	0.7641
8	0.8000	0.9242
9	0.7514	0.8779
10	0.7636	0.6354
11	0.7117	0.5283
12	0.9303	0.9405
13	0.4335	0.9770
14	0.9290	0.7813
15	0.4444	0.6111
16	0.6627	0.8932
17	0.9709	0.6981
18	0.9126	0.7798
19	0.9405	0.9587
20	0.4451	0.6722
21	0.9159	0.9167
22	0.7882	0.9425
23	0.8133	0.6916
24	0.8051	0.9232
25	0.6702	0.9405

Table 26

	5Tg	9Tg	
a / b	$p < 0.001$	$p < 0.001$	
a / c	$p < 0.001$	$p < 0.001$	
a / d	$p < 0.001$	$p < 0.001$	
a / e	$0.05 < p < 0.1$	$0.1 < p < 0.2$	
a / f	$p < 0.001$	$p < 0.001$	
a / g	$p < 0.001$	$p < 0.001$	
b / c	$0.3 < p < 0.5$	$0.2 < p < 0.3$	
b / d	$0.5 < p < 0.7$	$0.7 < p < 0.8$	
b / e	$p < 0.001$	$0.1 < p < 0.2$	
b / f	$p < 0.001$	$p < 0.001$	
b / g	$0.3 < p < 0.5$	$0.02 < p < 0.05$	
c / d	$0.95 < p < 0.98$	$0.98 < p < 0.99$	
c / e	$p < 0.001$	$0.001 < p < 0.01$	
c / f	$0.3 < p < 0.5$	$p < 0.001$	
c / g	$p < 0.001$	$0.05 < p < 0.1$	
d / e	$p < 0.001$	$0.001 < p < 0.01$	
d / f	$p < 0.001$	$p < 0.001$	
d / g	$0.7 < p < 0.8$	$0.05 < p < 0.1$	
e / f	$p < 0.001$	$p < 0.001$	
e / g.	$0.001 < p < 0.01$	$0.001 < p < 0.01$	
f / g	$p < 0.001$	$p < 0.001$	
	$\alpha = 0.05$	$\alpha = 0.01$	$\alpha = 0.001$
5Tg	14	14	13
9Tg	14	13	10

Table 28

3.0 Pilot study (3) (see chap.6)

<u>Kowasu</u> (break) (3rd year junior high school students)

object nouns	No. of associations	$\bar{M}$	SD
1 <u>mokei</u> (scale model)	129	2.93	1.39
2 <u>taichō</u> (health)	129	2.93	1.25
3 <u>kikaku</u> (project)	110	2.50	1.31
4 <u>taisei</u> (establishment)	113	2.57	1.25
5 <u>kibun</u> (emotions)	110	2.50	1.39
6 <u>kibō</u> (hope)	109	2.48	1.27
7 <u>okimono</u> (ornament)	128	2.91	1.44
8 <u>kōshō</u> (negotiation)	126	2.86	1.27
9 <u>kata</u> (shoulder)	122	2.77	0.97
10 <u>tōfu</u> (soya bean cake)	124	2.82	0.86
11 <u>hara</u> (abdomen)	118	2.68	1.04
	1318	119.82	7.72

$\chi^2 = 4.6712$ $(0.9 < p < 0.95)$

The null hypothesis is accepted

Table 1

Kowasu (break) (1st year university students)

object nouns	No. of associations	$\breve{M}$	SD
1	147	3.34	1.45
2	159	3.61	1.28
3	143	3.25	1.57
4	165	3.75	1.38
5	159	3.61	1.34
6	167	3.80	1.36
7	158	3.59	1.32
8	166	3.77	1.22
9	155	3.52	1.32
10	159	3.61	1.39
11	161	3.66	1.35
	1739	158.09	7.14

$\chi^2 = 3.5478$ $(0.95 < p < 0.98)$

Table 2

Yaburu (tear) (3rd year junior high school students)

object nouns	No. of association	$\overline{M}$	SD
1 chinmoku (silence)	96	2.40	1.26
2 hōritsu (law)	100	2.50	1.18
3 yūjō (friendship)	92	2.30	1.17
4 koigokoro (heart)	93	2.33	1.03
5 shihei (bank-note)	96	2.40	1.36
6 kyōtei (contract)	94	2.35	1.13
7 heiwa (peace)	99	2.48	1.30
8 kutsushita (stocking)	112	2.80	1.38
9 kibō (hope)	100	2.50	1.04
10 kitai (expectation)	104	2.60	1.34
	986	98.60	5.6780

$\chi^2 = 3.89$ $(0.9 < p < 0.95)$

Table 3

Yaburu (tear) (1st year university students)

object nouns	No. of associations	$\overline{M}$	SD
1	141	3.20	1.55
2	149	3.39	1.45
3	158	3.59	1.43
4	160	3.64	1.55
5	140	3.18	1.15
6	145	3.30	1.36
7	154	3.50	1.50
8	154	3.50	1.36
9	141	3.20	1.20
10	146	3.32	1.18
11	141	3.20	1.20
	1629	148.09	7.01

$\chi^2 = 3.88$ $(0.95 < p < 0.98)$

Table 4

comparison of the verb types (average frequency)

junior

	kowasu	Yaburu
$\overline{M}$	119.82	98.6
SD	7.72	5.6780
N	44	40

$t=14.44$ ($p < 0.01$)

Table 5

university

	Kowasu	Yaburu
$\overline{M}$	158.09	148.09
SD	7.14	7.01
N	44	44

$t=6.63$ ($p < 0.01$)

Table 6

junior VS university (Kowasu)

	junior	univ.
$\overline{M}$	119.82	158.09
SD	7.72	7.14
N	44	44

$t=24.14$ ($p < 0.01$)

Table 7

junior VS university (Yaburu)

	junior	univ.
$\overline{M}$	98.6	148.09
SD	5.6780	7.01
N	40	44

$t=35.69$ ($p < 0.01$)

Table 8

		Experimental	Control	
Kowasu (junior)	No. of groups	49	33	$\chi^2 = 3.122$
				$(0.05 < p < 0.1)$
	$\overline{M}$	2.23	1.5	$t = 1.82$
	SD	1.24	1.41	$(0.05 < p < 0.1)$
Yaburu (junior)	No. of groups	34	16	$\chi^2 = 6.48$
				$(0.02 < p < 0.01)$
	$\overline{M}$	1.7	0.8	
	SD	2.15	0.87	
Kowasu (senior)	No. of groups	61	40	$\chi^2 = 4.37$
				$(0.02 < p < 0.05)$
	$\overline{M}$	2.77	1.82	$t = 2.48$
	SD	1.7	1.9	$(0.01 < p < 0.02)$
Yaburu (senior)	No. of groups	77	55	$\chi^2 = 3.67$
				$(0.05 < p < 0.1)$
	$\overline{M}$	3.5	2.5	$t = 1.80$
	SD	1.97	1.7	$(0.05 < p < 0.1)$

Table 9

	No. of 2-item groupings	No. of more than 3-item groupings	Rank	MDS clusters
Kowasu (junior)	32	17	2.5	comparable to Yaburu (MDS) in university group (see §9.2.3(4))
	$\chi^2 = 4.5918$ (0.02 $<$ p $<$ 0.05)			
Yaburu (junior)	19	14	4	least structured
	$\chi^2 = 0.7576$ N.S.			
Kowasu (university)	34	27	1	most structured
	$\chi^2 = 0.8033$ N.S.			
Yaburu (university)	60	17	2.5	
	$\chi^2 = 24.013$ (p $<$ 0.001)			

Table 10

3.1 Data from the experiment of association values

Association Value (Kowasu)
(44 3rd-year junior high school students)

sen. \ subj.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. mokei	2	5	2	5	4	2	3	4	3	2	1	3	5	4	2	3	2
2. taichō	2	3	2	5	4	2	3	4	2	3	5	2	5	4	3	3	4
3. kikaku	2	3	2	5	4	3	3	2	1	3	1	1	1	5	3	0	0
4. taisei	1	5	2	2	5	2	1	2	2	2	2	3	3	5	2	1	3
5. kibun	2	4	2	5	3	0	3	2	1	2	1	1	2	4	2	2	5
6. kibō	2	4	2	5	3	2	3	2	2	1	3	1	2	4	3	2	3
7. okimono	2	2	2	5	5	2	3	5	2	3	1	2	5	5	1	1	5
8. kōshō	2	2	1	2	2	2	3	5	1	3	2	3	3	5	3	4	4
9. kata	2	4	2	3	3	3	3	4	3	3	1	3	2	4	3	2	3
10. tōfu	2	4	2	3	3	3	3	3	3	3	1	3	2	4	2	2	3
11. hara	2	3	1	3	4	3	2	3	4	3	2	3	2	2	4	3	3

sen. \ subj.	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1.	5	3	1	5	2	3	3	4	3	1	5	2	3	4	3	3	3
2.	3	2	2	4	5	2	2	3	2	2	3	1	4	2	3	3	1
3.	3	4	1	3	4	2	3	3	2	3	3	2	1	2	2	4	2
4.	1	1	2	3	5	3	2	2	2	2	2	1	3	3	2	4	3
5.	2	2	1	4	2	3	1	1	1	1	3	1	5	4	1	4	3
6.	1	2	1	5	2	5	2	1	1	2	2	2	3	4	1	3	2
7.	1	3	3	4	2	5	4	2	1	4	5	1	2	4	1	4	3
8.	1	3	4	5	4	5	2	2	2	2	4	2	3	5	2	4	4
9.	1	3	3	3	3	2	3	2	4	3	3	3	2	3	1	4	4
10.	2	3	3	2	4	3	3	2	3	3	4	3	2	3	1	4	4
11.	1	3	3	2	3	4	2	3	3	1	3	3	3	3	1	4	2

sen. \ subj.	35	36	37	38	39	40	41	42	43	44	Σ	$\bar{M}$	SD
1.	1	5	1	2	3	0	0	5	4	3	129	2,1318	1.388
2.	1	4	2	5	1	5	2	5	1	3	129	2.9318	1.2504
3.	1	2	3	5	3	3	0	5	3	2	110	2.5	1.3056
4.	2	4	2	5	3	3	0	5	3	2	113	2.5682	1.2504
5.	1	5	3	2	1	2	3	5	4	4	110	2.5	7.3899
6.	1	3	1	4	2	0	2	5	4	4	109	2.4773	1.2701
7.	2	3	2	5	2	2	2	5	1	4	128	2.9091	1.4431
8.	0	3	2	3	3	2	2	5	1	4	126	2.8636	1.2719
9.	2	3	3	5	2	3	1	5	1	2	122	2.7727	0.9738
10.	2	4	2	4	3	2	2	5	2	3	124	2.8182	0.8600
11.	2	3	2	5	1	1	1	5	3	4	118	2.6818	1.0395
											1318	119.8182	7.7203

w
Association Value (Kosasu)
(44 1st-year university students)

sen. / subj.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. mokei	4	5	1	4	3	3	5	2	5	5	5	5	5	5	3	4	4
2. taichō	2	5	2	5	3	2	4	5	5	5	5	5	4	5	2	3	4
3. kikaku	5	5	2	5	3	4	5	4	5	5	4	4	5	5	1	4	5
4. taisei	5	5	2	5	2	3	4	2	5	5	3	5	5	4	3	5	5
5. kibun	1	5	1	5	2	4	3	2	5	4	4	5	5	5	2	0	5
6. kibō	3	5	1	5	3	3	3	1	5	4	4	5	4	4	4	4	5
7. okimono	5	4	2	3	4	3	4	3	4	3	3	4	5	4	3	0	5
8. kōshō	4	5	3	4	4	2	3	3	4	5	2	5	5	4	4	5	5
9. kata	5	4	3	4	2	4	4	2	2	5	3	3	3	3	4	3	5
10. tōfu	5	7	2	3	2	6	2	2	1	5	3	4	5	4	5	3	4
11. hara	4	5	3	4	5	5	1	2	3	5	3	4	5	3	3	3	2

sen. \ subj.	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1.	1	1	1	4	3	1	5	4	3	4	3	2	1	3	4	2	5
2.	4	3	2	4	3	3	5	5	1	4	4	2	2	1	5	4	4
3.	1	1	2	1	4	4	5	5	1	4	5	1	2	2	1	5	1
4.	5	2	5	3	5	3	5	5	1	4	5	4	1	2	3	5	4
5.	2	4	4	2	4	3	5	5	1	4	5	0	1	2	4	4	4
6.	5	5	4	5		3	5	4	1	3	5	5	1	1	5	4	5
7.	4	3	4	5	4	4	5	3	1	5	5	5	2	2	4	2	4
8.	3	5	4	5	5	5	5	4	1	4	5	5	0	3	5	2	4
9.	5	4	5	4	3	5	5	3	1	4	5	2	1	3	5	3	5
10.	5	4	5	5	2	5	5	4	1	3	5	4	1	2	4	4	4
11.	4	4	3	5	3	5	5	5	1	4	5	3	1	1	5	5	5

sen. \ subj.	35	36	37	38	39	40	41	42	43	44	Σ	$\overline{M}$	SD
1.	5	3	5	3	1	3	4	5	2	1	147	3.3409	1.4451
2.	5	5	5	2	3	4	5	4	2	2	159	3.6136	1.2830
3.	2	1	5	2	2	4	3	4	2	2	143	3.25	1.5685
4.	3	5	5	5	1	5	4	4	1	2	165	3.75	1.3838
5.	5	4	3	1	2	1	4	4	2	3	159	3.6136	1.3351
6.	5	5	5	5	2	5	4	5	4	1	167	3.7955	1.3581
7.	5	5	5	0	3	5	4	5	3	2	158	3.5909	1.3197
8.	3	5	3	4	3	4	4	4	2	2	166	3.7727	1.2222
9.	5	5	4	0	3	5	4	4	1	2	155	3.5227	1.3227
10.	3	3	4	4	3	4	3	5	2	2	159	3.6136	1.3852
11.	5	5	5	3	3	5	4	4	1	2	161	3.6591	1.3474
											1739	158.0909	7.1408

Association Value (Yaburu)
(40 3rd-year junior high school students)

sen. \ subj.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. chinmoku	2	2	2	5	4	2	3	2	2	1	3	1	4	3	0	2	3
2. hōritsu	2	3	2	5	4	2	3	3	2	1	2	2	4	1	3	4	1
3. yūjyō	3	3	2	5	4	3	3	1	1	1	1	3	4	3	2	0	2
4. koigokoro	2	3	2	2	5	2	1	4	2	2	3	2	4	2	1	2	1
5. shihei	1	5	2	5	3	0	3	4	2	2	1	3	4	2	1	5	1
6. kyōtei	1	3	2	5	3	2	3	3	1	1	1	2	4	3	4	3	1
7. heiwa	2	4	2	5	5	2	3	1	1	1	2	3	4	3	2	5	1
8. kutsu-shita	3	5	2	5	5	5	1	1	3	2	3	3	4	2	1	5	3
9. kibō	3	3	2	2	4	4	3	1	2	1	2	2	4	2	3	3	2
10. kitai	1	3	1	5	5	1	3	1	2	1	2	2	4	2	2	3	1

sen. \ subj.	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1.	1	1	4	2	2	2	1	2	1	3	1	3	4	1	4	3	1
2.	2	2	3	2	2	4	1	1	2	2	2	1	4	2	4	3	1
3.	3	1	3	2	3	2	2	1	3	3	1	3	2	1	3	3	1
4.	1	2	3	2	3	1	3	1	2	1	2	3	4	1	4	3	2
5.	2	1	4	2	2	3	3	2	1	3	2	2	2	1	4	2	1
6.	2	1	3	2	2	3	2	2	2	4	1	3	3	1	3	2	0
7.	1	3	3	2	3	2	2	2	4	1	2	3	4	1	4	1	1
8.	1	4	3	2	2	3	1	3	2	3	1	1	4	2	3	3	2
9.	2	1	3	2	2	3	1	1	2	2	2	3	5	3	3	4	2
10.	2	2	3	4	2	2	1	1	2	3	1	3	4	5	4	5	2

sen. \ subj.	35	36	37	38	39	40	Σ	$\bar{M}$	SD
1.	5	3	5	1	2	3	96	2.4	1.2610
2.	3	3	5	3	4	0	100	2.5	1.1832
3.	5	2	2	3	0	2	92	2.3	1.1662
4.	3	1	4	3	2	2	93	2.325	1.0311
5.	4	1	5	2	3	0	96	2.4	1.3565
6.	3	2	5	1	3	2	94	2.35	1.1303
7.	2	2	5	3	0	2	99	2.475	1.3036
8.	3	4	5	2	5	0	112	2.8	1.3820
9.	4	2	5	2	1	2	100	2.5	1.0488
10.	5	2	5	3	2	2	104	2.6	1.3379
							986	98.6	5.6780

Association Value (Yaburu)
(44 1st-year university students)

sen. \ subj.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. chinmoku	3	2	1	2	2	5	4	4	5	3	5	2	5	2	3	3	4
2. funiki	3	4	1	2	3	4	4	4	5	3	2	2	1	2	2	1	4
3. hōritsu	2	4	2	1	5	3	3	4	4	3	4	5	5	3	4	2	4
4. yūjyō	2	5	0	1	5	5	2	4	4	3	4	2	5	3	4	2	4
5. koigokoro	3	3	3	4	5	2	2	4	3	3	4	3	2	4	3	2	3
6. shihei	4	2	2	4	4	2	2	4	4	3	4	2	2	4	1	1	3
7. kyōtei	0	2	3	4	4	4	3	4	5	3	5	3	5	2	2	2	4
8. heiwa	4	2	3	4	1	5	3	4	5	3	5	3	2	2	2	2	4
9. kutsu-shita	3	2	3	2	3	2	3	5	5	2	4	3	2	4	2	3	4
10. kibō	4	3	5	4	2	3	3	5	3	3	3	3	3	3	2	2	5
11. kitai	5	2	2	3	2	2	2	5	4	3	3	3	2	4	4	4	2

sen. \ subj.	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1.	4	5	1	4	5	2	1	4	5	3	5	5	5	5	3	5	1
2.	4	5	1	4	5	5	4	3	5	3	5	5	5	5	4	2	5
3.	4	2	3	4	5	5	5	5	5	5	4	5	5	5	0	4	4
4.	4	5	0	3	5	1	5	4	5	5	4	4	5	5	5	4	4
5.	4	3	3	5	4	3	3	5	2	3	4	2	3	5	0	4	5
6.	4	3	2	2	4	5	4	5	2	3	4	2	3	5	5	4	5
7.	4	5	5	5	4	2	3	5	4	5	2	5	4	5	0	1	5
8.	4	5	0	4	4	5	3	2	4	4	2	5	4	2	5	2	5
9.	4	3	2	5	5	2	4	4	3	4	4	3	2	5	3	2	4
10.	4	3	2	4	4	1	1	5	3	5	2	3	2	5	3	5	5
11.	3	4	2	3	5	2	3	2	3	4	4	3	2	5	3	3	4

sen. \ subj.	35	36	37	38	39	40	41	42	43	44	Σ	$\bar{M}$	SD
1.	1	1	5	5	3	0	3	1	2	2	141	3.2045	1.5450
2.	5	3	5	5	5	0	3	2	2	2	149	3.3864	1.4494
3.	5	5	4	2	2	5	2	0	1	4	158	3.5909	1.4352
4.	5	5	4	5	5	5	3	0	1	4	160	3.6364	1.5535
5.	2	3	4	5	2	3	2	1	2	5	140	3.1818	1.1535
6.	5	3	4	5	5	5	1	0	2	5	145	3.2955	1.3581
7.	1	5	5	2	5	5	3	1	3	5	154	3.5	1.5
8.	5	5	5	3	5	5	3	1	3	5	154	3:5	1.3568
9.	1	3	2	5	5	4	3	1	1	5	141	3.2045	1.1981
10.	4	4	2	4	5	4	3	1	2	4	146	3.3182	1.1827
11.	3	3	1	5	5	5	3	2	2	5	141	3.2045	1.1196
											1629	148.0909	7.0124

3.2 Free recall data (the Monk method)

Experimental Group (junior high school)

Kowasu

subjects

(1) 2 3 5 6 7 10 9 8 — 2-CO:(5,6)
5 6 2 3 4 11 10 8 1 9 7
1 2 4 3 5 6 7 8 9 10 11

(2) 7 2 1 10 9 3 6 11 8 4 — 2-CO:(6,11)
3 1 6 11 5 2 4 10 8 9
1 5 7 4 2 8 9 6 11 3 10

(3) 1 10 7 11 2 3 4 5 — 2-VO:(11,2)
10 1 7 2 11 3 4 5 — 3-CO:(3,4,5)
1 7 10 2 11 3 4 5 6 — 3-VO:(1,10,7)

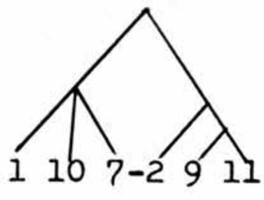
(4) 1 10 3 8 11 2 6 — 2-CO:(1,10)
2 11 7 1 10 6 3 8 5 — 2-VO:(3,8),(11,2)
7 1 10 11 2 8 3 4 5 6

(5) 4 1 2 7 10 11 8 3 — 2-CO:(7,10)
2 11 1 7 10 8 3 4 5 6 — 2-VO:(8,3)
9 2 11 1 7 10 3 8 4 6 5

(6) 1 9 10 3 4 8 11 6 — 2-VO:(4,8)
9 10 1 7 5 6 11 2 3 4 8 — 3-VO:(1,9,10)
1 9 10 11 2 7 6 3 8 4 5 — 3-CO:(3,4,8)

(7) 1 11 10 7 3 5 — 2-CO:(10,7)
1 10 7 11 3 8 5 6
2 11 9 1 10 7 5 8 3

(8) 1 10 7 2 9 11 5 3 8 — 2-VO:(1,10)
10 1 7 9 11 2 5 6 4 3 8 — 2-CO:(9,11),(3,8)
3 8 4 5 6 10 1 7 9 11 2 — 3-CO:(1,1,7)
3-VO:(2,(9,11))
6-CO:(11,7-2,(9,11))



(9) 1 7 10 9 2 5 3 8 — 2-CO:(3,8)
10 7 1 11 2 9 5 6 3 8 — 2-VO:(9,2)
11 2 9 10 7 1 5 4 6 3 8 — 3-SO:(1,7,10)

(10) 1 2 3 5 6 7 9 10 11 — 2-CO:(5,6)
1 7 10 9 11 2 3 8 4 5 6 — 2-VO:(9,10)
1 7 10 9 11 2 8 3 4 5 6 — 4-CO:(7-(9,10)-11)

(11) 5 2 4 11 9 6 1 7 — 2-CO:(11,9)
5 6 2 11 9 1 7 10 4 3 — 2-VO:(1,7)
4 3 5 2 11 9 7 1 10 6 8

(12)	1 7 9 2 5 6 7 1 10 9 2 11 5 3 1 10 7 9 11 2 5 3 8 6	
(13)	10 7 1 2 9 4 1 10 7 2 9 11 4 5 2 9 11 4 5 6 1 7 10	2-CO:(2,9) 3-VO:(10,7,1)
(14)	6 2 3 1 10 11 6 2 11 1 10 7 3 4 6 5 2 11 10 1 7 3 8 4	3-VO:(1,10,11)
(15)	10 5 2 9 7 1 10 5 6 9 2 1 7 11 1 7 11 9 2 5 6 10 4 3	2-VO:(2,9),(7,1)
(16)	1 10 2 4 9 11 3 1 10 7 2 9 11 4 3 8 5 6 10 7 1 2 9 11 5 3 8 4 6	2-CO:(9,11)
(17)	1 10 9 7 11 1 10 7 9 11 2 5 6 10 7 1 9 11 2 3 8 4 5 6	4-VO:(1,10,9,7) 5-CO:(1,1,1,1-11)
(18)	1 2 3 8 7 9 11 10 4 6 1 5 6 2 9 11 3 8 4 7 10 1 6 3 8 7 9 11 2 4 10 5	2-CO:(3,8),(9,11)
(19)	1 2 3 4 7 5 1 7 5 6 3 4 2 11 1 7 5 6 3 4 2 11 10 9	2-CO:(3,4),(7,5)
(20)	1 10 7 11 9 4 5 6 1 7 10 11 9 2 3 6 8 5 10 1 7 9 11 2 3 8 4 5 6	2-VO:(11,9) 3-VO:(1,10,7) 5-VO:(1,10,7,11,9)
(21)	1 7 4 3 5 8 11 9 10 10 1 7 9 11 2 4 3 5 6 8 9 11 2 4 3 5 6 1 7 10 8	2-CO:(1,7) 2-VO:(11,9) 3-CO:(4,3,5)
(22)	1 10 5 11 2 8 7 6 4 1 10 9 11 2 5 6 3 4 7 10 1 9 11 2 4 8 3 5 6	2-VO:(1,10) 2-CO:(11,2)

Control Group (junior high school)

Kowasu

subjects

(1) 4 2 10 9 5 3 2-CO:(4,2)
4 2 3 5 10 9 1 11 7 8
4 2 5 8 7 6 11 9 7 10 3

(2) 7 9 3 4 1 10
7 1 4 2 9 10 5 6 3 8 11
7 4 2 9 10 5 6 1 8 11 3

(3) 4 6 3 8 7 1 10 9 2-VO:(7,1),(10,9)
4 5 6 8 3 1 7 10 9 11 4-VO:(7,7,10,10)
2 11 9 10 1 7 4 8 5 6 3

(4) 1 7 11 6
7 1 5 10 9 11 6
1 10 7 9 11 3 5 8 4

(5) 11 1 6 10 4 3 5
1 4 3 6 9 10 7 11 5
1 7 9 5 8 10 11 6 2

(6) 4 5 2 10 6 11 1 7
2 5 9 8 11 7 4 10 6 3
2 4 5 6 9 1 7 10 3 8 11

(7) 1 7 10 5 8 3 2-VO:(7,10)
1 10 7 4 6 11 9 2 5 3 8 3-CO:(1-(7,7))
1 7 10 9 11 2 3 8 5 6 4 3-VO:(5,8,3)

(8) 1 4 9 3 10 11 7 6
4 2 1 3 10 9 5 6 8 7
1 2 9 4 3 5 6 8 7 11 10

(9) 9 11 2 1 10 3 8 2-VO:(9,11),(1,10)
2 5 11 9 10 1 8 4 3 6
9 11 2 10 1 7 5 6 3 4 8

(10) 9 7 11 6 8
2 1 4 10 5 6 11 9 7
3 2 1 11 10 4 7 6 9 8 5

(11) 10 9 1 7 5 6 2-VO:(10,9)
1 7 9 10 11 2 3 4 8
1 2 11 5 6 9 10 7 3 8 4

(12) 11 2 3 9 1 8 2-VO:(11,2)
2 11 9 10 3 8 5 6
1 10 7 9 11 2 3 4 5 6

(13) 4 10 5 3 8 2 1 7 11 2-CO:(3,8),(1,7)
4 3 8 1 7 9 11 10 5 6 2
4 2 1 7 9 11 3 8 3 5 6

(14) 9 4 3 11 5 7 10
11 5 4 3 9 10 7 6 1 8
3 4 11 9 5 10 7 2 6 8

2-VO:(7,10)
5-VO:(9,4,3,11,5)
7-CO:(9,9,9,9,9,7,7)

(15) 2 3 4 5 1 9
4 2 9 11 1 10 3 8 5 6
2 4 9 3 8 1 5 11 7 10 6

(16) 2 9 11 10 3 8 2 4 5 6
2 1 7 9 10 11 5 6 3 8
2 5 6 7 1 10 9 11 3 8

2-CO:(3,8),(5,6)
3-VO:(9,11,10)

(17) 1 7 10 11 9 2 4 5
7 1 10 2 11 9 4 5 6
1 7 10 2 11 9 4 3 5 8 6

2-CO:(11,9)
2-VO:(1,7)
3-CO:(11,10)
3-VO:((11,9),2)
4-CO:(((11,9),2)-4)

(18) 8 10 1 7 11 2 5 3
2 11 9 1 10 7 6 4 3 8
1 10 7 5 2 11 6 3 8 9 4

2-VO:(10,1),(11,2)
3-CO:((10,1)-7)

(19) 10 7 1 9 11 5 6
3 4 2 8 6 9 11 5 1 10
1 10 4 2 8 9 11 7 5 6

2-CO:(9,11)

(20) 6 3 2 4 9
3 6 2 9 10 7 4 8 5
3 6 1 4 11 9 7 2 8 5

2-VO:(6,3)

(21) 2 5 9 3 6
1 2 5 4 9 11 8 3 10 6
2 5 4 1 6 11 10 7 8

2-CO:(2,5)

(22) 7 1 11 9 2 3 8 4
10 9 11 7 1 2 3 4 8 5
2 10 9 11 8 3 4 5 6 1 7

2-VO:(7,1),(11,9)
3-VO:(3,8,4)

C. <u>Experimental (University)</u>

<u>Kowasu</u>

subjects

(1) 1 2 8 11 10 7
3 4 5 9 8 2 1 6 11 10 7
4 3 6 5 9 8 2 10 7 11 1

2-CO:(10-7)
2-VO:(2,8)
3-VO:(11,(10-7))

(2) 2 1 11 10 9 7 6 3
2 4 1 6 11 9 7 10 3
2 4 5 1 9 11 7 6 10 3 8

5-VO:(11,10,9,7,6)
7-CO:(1-(11,11,11,11)-3)

(3) 1 8 11 9 2 10 7 3 6 5 4
3 8 11 9 2 4 7 10 6 5
3 8 1 2 4 11 9 10 7 6 5

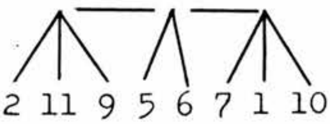
2-CO:(11,9),(6,5)
2-VO:(10,7)

(4) 1 2 11 10 9 4 3 5 6
2 5 4 3 7 8 11 9 10 1 6
2 4 3 1 9 11 10 5 6 7 8

3-VO:(11,10,9)
2-CO:(4,3)

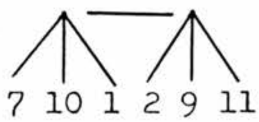
(5) 2 11 9 5 6 7 1 10
2 9 11 5 6 7 10 1 3 4
2 9 11 6 5 7 10 1 3 4 8

2-VO:(11,9),(5,6),(1,10)
3-VO:(2,11,9),(7,1,10)
8-CO:(2,2,2,5,5,7,7,7)



(6) 7 10 1 2 9 11
7 10 1 5 6 8 3 4 2 9 11
7 10 1 6 5 8 3 4 9 11 2

2-CO:(9,11)
3-CO:(7,10,1)
3-VO:(2,(9-11))
6-CO:(7,7,7,2,2,2)

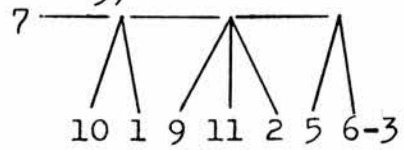


(7) 2 10 9 11 8 3 6 5 7 4
1 2 3 5 6 10 9 11 4 7 8
2 3 1 9 11 8 10 7 4 5 6

3-VO:(9,11),(6,5),(7,4)

(8) 7 10 1 9 11 2 5 6 3
7 1 10 2 11 9 6 5 3 8 4
7 1 10 9 11 2 5 6 3 4 8

2-VO:(10,1),(5,6)
3-CO:(7,10,10),(5,5,3)
3-VO:(9,11,2)
7-CO:(7,10,10,9,9,9,5,5,
5)



(9) 4 8 6 1 7 10 2 11
6 8 3 4 5 1 7 10 9 11 2
3 4 8 7 1 10 9 11 2 5 6

2-VO:(2,11),(1,7)
3-CO:(1,1,10)

(10) 5 4 9 7 2 11 6 8 10
5 6 3 4 8 2 11 9 10 7 11
5 6 4 3 8 9 2 11 1 7 10

2-CO:(2,11)

(11) 10 4 8 11 9 2 5 6 1 3
10 1 5 6 8 2 9 11 3 7 4
10 4 5 6 7 9 11 2 3 8 1

2-CO:(5,6)
3-VO:(11,9,2)

(12) 3 8 4 11 2 10 9 1 7
3 4 5 6 8 9 11 2 1 7 10
3 4 8 5 6 9 2 11 10 7 1

2-VO:(11,2),(1,7)

(13) 8 1 10 11 9 3 6 4
10 11 9 1 4 2 3 7 6 5 8
10 4 2 3 8 5 9 11 6 7 1

(14) 2 5 6 9 8 3 10 7
4 11 1 3 5 2 6 10 9 7 8
2 5 6 11 9 10 4 1 8 7 3

2-VO:(2,5)
3-CO:(2,2,6)

(15) 7 1 10 9 11 2
1 7 10 9 11 2 5 6 4 3
7 1 10 9 11 2 5 6 4 3 8

2-VO:(7,1)
3-CO:(7,7,10)
3-CO:(9,11,2)
5-CO:(7,7,10,9,11,2)

(16) 5 6 2 11 9 7 1 10
6 5 11 2 9 1 7 10 4 3
5 6 9 2 11 7 1 10 4 3 8

2-VO:(5,6),(7,1)
3-VO:(2,11,9)
3-CO:(7,7,10)
8-CO:(5,5,2,2,2,7,7,10)

(17) 2 1 5 4 11 10 3
11 9 1 2 5 4 6 3 10
2 4 9 11 3 7 5 6 8 10 1

(18) 5 6 2 4 3 9 11 10 8 7
1 5 6 3 2 4 8 7 9 11 10
3 5 8 1 2 4 9 11 7 10 6

2-CO:(2,4)

(19) 3 4 8 6 5 2 9 11 10 7 1
5 8 3 4 2 9 11 10 7 1 6
2 3 4 10 1 7 5 6 8 9 11

2-CO:(3,4),(9,11),(7,1)
3-CO:(10,7,7)

(20) 1 10 2 4 5 9 11
7 8 5 3 4 11 9 10 1
1 10 4 2 6 8 7 3 11 9

2-VO:(1,10),(9,11)

(21) 2 9 11 10 1 7 3 8
2 9 11 7 1 10 4 8 3 5 6
2 11 9 7 1 10 4 8 3 5 6

2-VO:(9,11),(3,8)
3-SO:(10,1,7)
3-CO:(2,9,9)
8-CO:(2,9,9,10,10,3,3)

(22) 2 6 1 9 4 11 8 3 7 10 2-CO:(7,10)
6 5 9 11 2 1 7 10 8 3 4
6 5 9 2 11 1 7 10 8 4 3

D. <u>Control Group (University)</u>

<u>Kowasu</u>

subjects

(1)	6 9 11 5 10 1 7 4 8 3 9 2 11 6 5 10 1 7 4 8 3 2 11 9 5 6 1 10 7 8 4 3	2-VO:(10,1),(4,8) 3-CO:(10,10,7) 3-VO:(4,4,3) 6-CO:(10,10,7,4,4,3)
(2)	4 8 3 6 7 10 3 4 8 5 6 11 2 9 1 7 10 3 4 8 6 5 11 2 9 1 7 10	2-CO:(4,8),(7,10) 3-VO:(4,8,3)
(3)	4 8 3 6 5 2 11 9 1 7 10 8 3 4 6 5 11 2 9 7 1 10 8 4 3 5 6 11 2 9 10 1 7	2-VO:(6,5),(2,11) 3-VO:(2,11,9),(1,7,10) 3-VO:(4,8,3) 3-CO:(2,2,9) 11-CO:(4,4,4,6,6,2,2,2,1, 1,1)
(4)	11 9 5 8 4 3 10 1 9 11 2 5 6 4 8 3 10 1 7	2-VO:(11,9),(8,4),(10,1) 3-CO:(8,8,3) 5-CO:(8,8,8,10,10)
(5)	1 10 9 7 2 11 5 8 3 6 4 3 4 8 6 5 2 11 9 10 1 7 9 11 2 10 1 7 3 4 8 6 5	2-VO:(1,10),(2,11)
(6)	1 7 10 9 11 5 8 3 3 4 8 2 11 6 5 9 10 1 7 9 11 2 10 1 7 3 4 8 6 5	2-CO:(1,7) 3-VO:(1,7,10)
(7)	1 6 3 2 11 9 10 8 7 5 1 2 4 3 6 5 9 11 7 8 10 1 6 5 3 4 2 9 11 7 8 10	2-VO:(11,9) 3-VO:(10,8,7)
(8)	2 1 6 9 10 3 5 4 3 2 4 7 11 9 1 10 5 8 6 2 4 6 10 9 11 3 1 5 8 7	
(9)	3 4 9 11 2 10 6 7 1 3 5 6 4 2 9 11 10 7 1 6 5 8 3 4 9 11 2 10 1 7	2-CO:(9,11) 2-VO:(7,1) 3-VO:(9,11,2)
(10)	7 1 11 9 3 2 5 4 6 8 3 10 2 9 11 7 1 5 3 4 8 6 2 9 11 1 7 10	4-VO:(7,1,11,9)
(11)	1 2 3 11 10 7 3 2 7 6 4 9 11 10 1 3 4 6 7 5 7 10 9 11 8 2	
(12)	11 7 5 6 1 2 1 2 5 11 10 6 9 3 6 4 2 1 10 9 8 5 7 11	2-VO:(1,2)

(13) 8 9 11 1 6 10 3 4
8 7 2 4 6 3 11 9 10 1
8 9 11 3 5 6 7 10 4 2 1
2-VO:(9,11)

(14) 6 7 2 4 9 11 5 8 10 3 1
3 4 1 2 6 5 9 11 10 8 7
1 2 3 4 5 6 7 8 9 10 11

(15) 1 8 9 10 11 2 5 7 3 6
1 9 11 7 4 2 5 6 3 10 8
5 2 4 7 10 1 6 8 3 9 11
2-VO:(2,5)

(16) 1 6 11 10 7 2 9
1 3 4 8 7 11 10 2 6 9
5 2 1 3 8 6 7 10 9 11 4

(17) 3 7 2 11 6 10 1 5
3 6 9 11 2 4 10 7 8 5
5 6 7 3 4 9 11 8 10

(18) 6 9 11 8 3 10 5 7
1 4 2 9 11 5 6 10 3 7
1 7 3 9 11 2 4 6 10 8
2-CO:(9,11)

(19) 11 2 5 10 7 6 3 1
5 2 4 3 9 11 10 6 1 8 7
11 2 5 6 3 7 4 9 11 10 8
2-VO:(2,5)

(20) 2 4 7 10 9 11 5 6 3
2 4 5 3 6 8 9 11 7 10 1
2 4 7 1 9 11 10 8 5 6 3
2-CO:(2,4),(9,11),(6,3)
9-VO:(2,4 ..9,11..6,3)

(21) 1 4 2 3 10 9 7
2 5 6 4 3 11 10 9 1 7 8
1 9 2 4 3 11 10 5 6 8 7

(22) 7 6 5 11 2 4 3 9
7 3 1 5 6 4 2 9 11 8 10
2 1 4 5 6 11 9 8 3 10
2-VO:(6,5)

E. Experimental Group (junior high school)

Yaburu

subjects

(1) 8 5 7 6 10 3 4 9
9 7 10 6 2 4 8 5 1 3
9 3 4 7 6 8 5 1 2

2-CO:(8,5)

(2) 6 2 8 5 3 4
5 8 9 10 3 4 7 2 6
1 8 5 9 10 4 3 7 6 2

2-VO:(6,2),(8,5),(3,4)
4-CO:(8,8,3,3)
6-VO:(6,6,8,8,3,3)

(3) 6 2 8 3 5 4
2 3 4 6 10 5 8
2 7 9 8 3 4 5 10 6

(4) 7 3 6 5 2 8 4 1
1 5 8 2 6 3 4 9 10
7 3 4 6 2 5 8 9 10

3-VO:(5,2 8)
4-VO:(6,5,5,5)

(5) 7 9 10 6 8 3 4 2 5
1 2 6 5 3 4 7 9 10 8
1 6 2 5 8 3 4 7 9 10

2-CO:(3,4)
3-CO:(7,9,10)

(6) 8 5 7 6 10 3 4 9
5 2 1 9 10 8 6 3 4 7
1 3 4 2 5 6 7 8 9 10

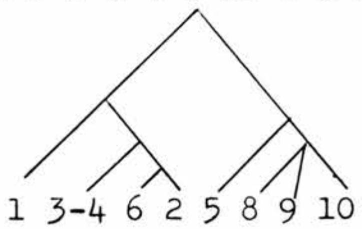
2-CO:(3,4)

(7) 1 3 4 5 2 9 8 7 6 10
1 2 6 3 10 9 7 8 4 5
1 3 4 2 5 7 6 8 9 10

(8) 6 2 8 5 3 4
2 8 5 6 10 3 4
1 7 9 8 5 2 6 3 4

2-CO:(8,5),(3,4)
4-VO:(6,2,2,2)

(9) 1 3 4 6 2 5 8 9 10
2 6 3 4 1 7 9 10 8 5
1 6 2 3 4 5 10 8 9 7



2-CO:(3,4)
2-VO:(6,2)
3-VO:(8,9,10)
4-VO:(5,8,8,8)
4-VO:(3,4,6,2)
5-VO:(1,3,3,3,3)
9-CO:(1,1,1,1,1,5,5,5,5)

(10) 7 1 8 5 4 3 6 2
1 3 4 5 8 2 6
3 4 5 8 1 7 2 6

2-VO:(6,2)
4-SO:(8-5-4-3)
5-VO:(1,8-5-4-3)
7-CO:((1,8-5-4-3)-(6,6)

(11) 1 4 2 7
1 7 6 2 3 5 8 4 10
1 7 2 4 6 5 8 9 3 10

(12) 1 6 8 4
1 2 3 4 8 10 6 9 7
1 2 3 8 5 10 9 6 1 4

(13) 1 3 4 6 2 7 5
1 2 6 5 3 4 8 7 10 9
2 6 1 4 3 5 9 7 10 8

2-VO:(3,4),(6,2)

(14) 4 8 7 2 6
1 10 4 6 8 3 9 7
1 7 6 3 5 4 10 9 2

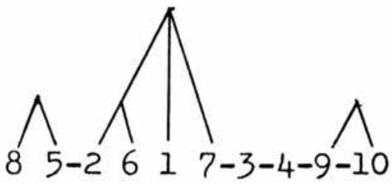
(15) 10 8 2 4 9 5 7 6
1 10 6 3 5 8 9 4 2
1 9 7 3 4 8 6 2 10 5

(16) 8 5 2 6 1 7 3 4
3 2 6 4 8 5 7 1
1 3 4 2 8 9 5 10 7 6

(17) 1 8 4 2 9 6 3 10
1 3 6 8 4 7 5 10 2
1 10 2 7 8 6 9 5 10 7 6

(18) 8 5 2 6 1 7 3 4 9 10
9 10 5 8 7 1 6 2 3 4
5 8 1 2 6 7 3 4 10 9

2-VO:(8,5),(2,6),(9,10)
2-CO:(3,4)
4-VO:(2,2,1,7)
3-VO:(2,6,1)
10-VO:



(19) 4 3 7 5 8 2 6 9 10
1 9 10 5 8 4 3 2 7 6
7 3 4 10 9 5 1 8 2 6

2-VO:(4,3),(9,10)

(20) 9 10 2 3
1 3 6 10 7 4 5 2
1 4 5 10 7 3 8 9

Control Group (junior high school)

Yaburu

subjects

(1) 2 1 6 10 9 8 7 4 3
8 2 3 7 1 9 4
1 2 3 6 7 10 8 9 5

(2) 3 5 6 7 8 4 10 1 9
4 5 6 8 9 2 7
5 4 2 3 8 6 7 10 9 1

(3) 1 3 4 8 6 2 — 2-VO:(6,2)
2 6 8 9 10 3 4 — 2-CO:(3,4)
2 6 5 8 9 10 3 4

(4) 1 5 8 2 6 3 — 2-VO:(5,8)
2 6 1 7 8 5 9 10 — 2-CO:(2,6)
9 10 5 8 7 2 6 3 4

(5) 1 3 4 8 2
1 2 6 8 9 10 7
1 2 6 5 8 9 10 3 4

(6) 2 1 10 4 9 5 8 7 — 2-CO:(5,8)
2 1 3 4 6 7 5 8 10 9
7 1 3 4 2 6 10 9 5 8

(7) 1 8 5 4 10 2
1 8 6 9 3 7 4 5 10
1 7 2 5 6 3 8 10 9

(8) 1 2 6 7 10 4
1 2 8 4 3 2 10 9 5 7
1 3 6 2 10 9 5 8 4 7

(9) 7 4 2 8 5 6
1 5 10 9 7 3 2 6 8 4
1 3 7 6 2 8 10 9 4 5

(10) 4 6 7 1 10 9 — 2-CO:(7,1),(10,9)
7 1 4 6 10 9 2 8 3 5
7 1 6 3 10 9 2 8 5 4

(11) 1 7 8 5 6 2 4
1 10 8 6 9 4 5 2 7
2 9 10 8 3 6 4 7 5 1

(12) 3 8
8 4 7 3
6 7 3 4 8 1 10 2 9 5

(13) 7 4 2 8 5 6 — 2-VO:(8,5)
1 7 8 5 6 2 4 — 4-VO:(2,8,8,6)
1 3 4 5 8 2 6 — 5-VO:(4,2,2,2,2)

(14) 7 5 1 4 10 2
6 8 1 2 4 9 10 3 7 5
1 2 4 6 5 7 10 9 8 3

2-VO:(7,5)

(15) 5 7 4 6 8 9 2 3
10 4 1 6 8 2 7 9 3
5 3 1 7 4 6 9 10 8 2

(16) 4 3 7 6 2 1 8 5
1 3 9 10 4 6 7 5 8 2
4 7 3 10 8 5 6 1 9 2

2-VO:(8,5)

(17) 6 2 8 3 5 4
1 2 6 5 3 4 7 9 10 8
1 6 2 5 8 3 4 7 9 10

2-VO:(6,2)

(18) 7 1 8 5 4 3 6 2
1 3 4 5 8 6 2
6 2 1 7 3 4 9 5 8

2-VO:(8,5),(4,3)
2-CO:(6,2)

(19) 5 8 1 9 4 3
1 4 9 10 5 8 3
5 8 4 3 1 9 10

2-CO:(5,8)

(20) 4 3 2 7 6
1 3 4 2 6 8 5
8 5 4 3 2 6 7

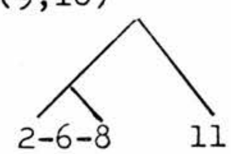
3-VO:(4,3,2)

A. <u>Experimental Group (University)</u>

<u>Yaburu</u>

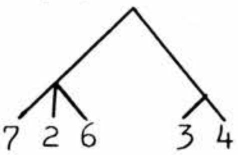
subjects

(1)	9 4 3 5 11 7 6 1 8 10 9 11 5 3 4 11 1 2 7 9 6 5 4 3 8 10	3-VO:(4,3,5)
(2)	7 3 4 1 9 10 5 11 3 4 10 9 6 7 5 8 1 11 2 7 3 4 11 1 6 2 5 8 9 10	2-CO:(3,4) 2-VO:(9,10)
(3)	1 11 9 3 4 2 7 6 5 8 10 9 10 7 6 8 5 1 11 3 2 4 10 9 8 5 7 2 6 3 4 1 11	2-CO:(1,11) 2-VO:(5,8)
(4)	9 3 10 11 7 5 8 9 10 8 5 3 4 7 6 1 11 9 2 3 1 11 5 8 10 7 6 4	2-VO:(5,8)
(5)	1 3 4 9 8 11 5 6 2 7 1 11 3 4 6 2 7 10 9 5 8 1 11 2 6 3 4 5 7 8 10 9	2-CO:(3,4) 2-VO:(6,2)
(6)	8 5 9 1 2 6 11 7 3 4 1 11 8 5 10 9 4 3 2 6 7 1 11 2 6 3 4 5 8 7 9 10	2-CO:(2,6) 2-VO:(8,5),(3,4)
(7)	1 2 3 4 9 10 6 7 5 8 1 11 3 4 5 2 6 8 7 9 10 9 10 5 8 3 4 7 2 6 11 1	2-CO:(3,4),(9,10)
(8)	11 2 6 7 3 1 9 10 5 8 4 9 10 1 11 5 8 2 6 3 4 3 1 11 4 2 6 7 9 10 5 8	2-CO:(2,6),(9,10), (5,8)
(9)	3 5 8 4 6 2 9 10 1 11 3 1 11 4 2 6 7 5 9 10 8 9 10 1 11 5 8 2 6 3 4	2-VO:(6,2) 2-CO:(9,10),(1,11) 4-VO:(6,6,9,9)
(10)	9 1 2 6 3 4 8 5 1 11 6 2 7 5 8 4 3 10 9 7 11 3 4 6 2 5 8 9 10	2-VO:(2,6),(3,4),(8,5)
(11)	9 10 8 6 7 3 4 1 11 2 3 4 9 10 8 7 6 1 11 3 4 5 7 6 8 9 10 2	2-VO:(6,7) 2-CO:(9,10),(3,4) 3-VO:(8,6,7), 5-VO:(9,10,8,8,8)
(12)	3 4 2 6 8 11 1 7 9 10 5 1 3 4 11 8 6 2 10 9 5 7 1 11 2 6 8 7 9 10 3 4 5	2-CO:(3,4) 3-SO:(2,6,8) 2-VO:(9,10) 4-VO:



(13) 1 11 9 10 7 2 6 3 4
1 11 9 10 8 3 4 7 2 6 5
9 10 8 5 6 7 2 4 3 11 1

2-VO:(1,11),(3,4)
2-CO:(9,10),(7,2)
3-VO:(7,2,6)
5-VO:

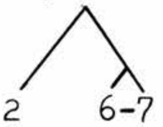


(14) 9 10 3 4 8 11 1 6 2
1 11 2 3 4 5 6 7 9 10
1 11 2 3 4 5 6 7 8 9 10

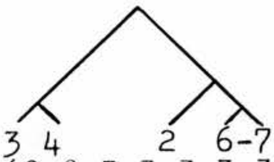
2-CO:(9,10),(3,4)
2-VO:(11,1)

(15) 9 10 8 5 3 4 2 6 7 1 11
9 10 3 4 6 7 2 1 11 8 5
9 10 11 1 8 5 3 4 2 6 7

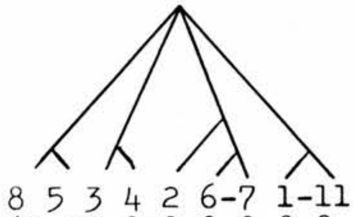
2-CO:(9,10),(8,5),(3,4)
(6,7)
2-VO:(1,11)
3-VO:(2,6,6)



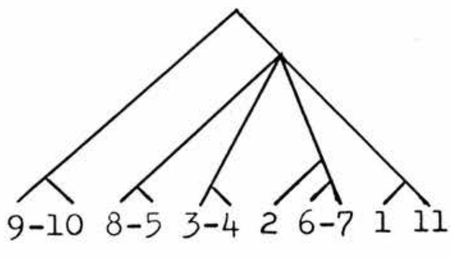
5-CO:(3,4,2,2,2)



9-VO:(8,8,3,3,3,3,3,1,1)

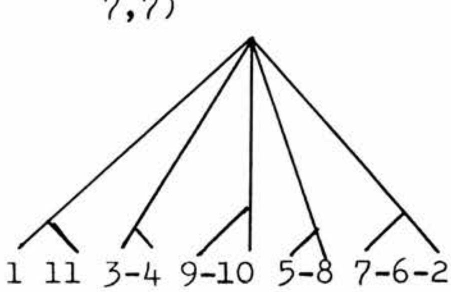


11-CO:(9,10,8,8,8,8,8,8,
8,8,8)



(16) 1 11 3 4 9 10 5 8 7 6 2
9 10 7 6 2 3 4 5 8 1 11
9 10 11 1 3 4 2 6 7 5 8

2-VO:(1,11)
2-CO:(3,4),(9,10),(5,8)
3-SO:(7,6,2)
11-VO:(1,1,3,3,9,9,5,5,7,
7,7)



(17) 1 2 11 3 4 6 7 9 10 8
1 11 3 4 5 6 7 9 10 8
9 10 3 4 2 5 6 7 1 11

2-CO:(3,4),(6,7),(9,10)

(18) 3 4 9 10 2 1 11 5 8 6 7
9 10 7 4 3 2 11 5 8 6 1
9 10 7 6 2 3 4 5 8 1 11

2-VO:(3,4)
2-CO:(9,10),(5,8)

(19) 11 6 3 4 8 9 10 1 5
1 11 2 3 4 6 8 9 10 5 7
1 11 2 3 4 6 8 7 9 10 5

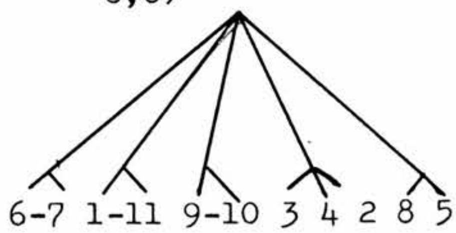
2-CO:(3,4),(9,10)

(20) 1 5 4 11 2 7 6 9 10 3 8
1 11 2 7 6 8 9 10 4 5 3
1 11 2 3 4 5 6 7 8 9 10

2-VO:(5,4),(7,6)
2-CO:(11,2),(9,10)

(21) 6 7 1 11 9 10 3 4 2 8 5
1 11 2 3 4 5 8 9 10 6 7
1 11 2 3 4 6 7 9 10 5 8

2-CO:(6,7),(1,11),(9,10)
(3,4)
2-VO:(8,5)
3-VO:(3,4,2)
11-VO:(6,6,1,1,9,9,3,3,3,
8,8)



(22) 3 4 6 9 10 2 5
3 4 6 7 9 8 10 11
3 6 4 7 1 11 8 9 10 2 5

2-VO:(4,6)
3-CO:(3,4,4)

B. Control Group (University)

Yaburu

subjects

(1)	1 5 8 6 2 3 4 9 10 9 10 2 6 3 4 8 5 7 11 1 5 8 6 2 3 4 11 9 10	2-CO:(3,4),(9,10) 2-VO:(6,2),(5,8) 4-CO:(6,6,3,4) 6-VO:(5,5,6,6,3,4)
(2)	10 4 3 9 2 8 5 10 6 2 7 8 5 3 4 9 1 11 10 9 6 2 8 5 7 1 3 4	2-CO:(8,5) 2-VO:(4,3)
(3)	9 10 4 5 7 6 1 11 3 4 5 10 9 7 6 8 1 11 2 3 4 5 9 10 8 7 6	2-CO:(4,5),(7,6) 2-VO:(9,10)
(4)	5 8 4 3 6 2 1 11 9 10 3 4 7 6 5 8 2 11 1 9 10 3 4 7 2 6 5 8 1 11	2-CO:(5,8) 2-VO:(4,3),(1,11)
(5)	9 11 4 5 3 7 6 2 9 10 8 11 1 4 3 7 6 2 5 9 10 8 5 4 7 3 2 6 1 11	2-VO:(3,7),(6,2) 4-VO:(3,3,6,6)
(6)	8 9 2 3 4 1 11 5 9 10 3 4 5 7 6 2 8 1 11 3 4 9 7 5 2 8 1 5	2-CO:(3,4)
(7)	6 7 8 4 9 10 2 3 1 1 4 3 6 5 7 10 9 8 11 11 1 3 4 8 7 6 11 9 10 5	2-VO:(9,10)
(8)	7 1 11 9 2 6 3 4 5 8 6 7 9 10 2 1 11 8 5 4 6 7 2 5 8 3 4 9 10 1 11	2-CO:(1,11) 2-VO:(5,8)
(9)	2 3 4 9 6 5 7 8 1 11 2 3 4 5 8 6 7 9 10 1 11 2 3 4 5 6 7 8 9 10	3-CO:(2,3,4)
(10)	6 9 4 5 3 1 2 11 1 11 2 3 4 5 6 9 7 10 1 11 2 5 4 3 7 10 6 9	2-VO:(2,11) 2-CO:(6,9) 3-CO:(1,2,2) 3-VO:(4,5,3) 6-VO:(4,4,4,1,1,1)
(11)	9 4 1 3 2 11 10 8 5 6 1 11 7 9 10 3 4 6 8 5 1 11 2 7 3 10 4 8 5 9	2-CO:(8,5)
(12)	9 3 4 2 10 5 7 2 7 10 9 3 4 8 5 6 1 11 1 11 7 6 2 3 4 9 8 5	2-CO:(3,4) 3-VO:(9,3,4)

(13) 9 4 3 5 6 7 8 1 11 2
10 9 1 11 3 4 6 7 8
10 9 1 11 8 6 7 4 3

2-CO:(1,11),(6,7)
2-VO:(4,3)
3-VO:(6,7,8)

(14) 9 7 6 5 3 4 8 11 1
10 2 11 1 3 4 7 6 5 8 9
10 2 11 3 4 7 6 5 8 9 1

2-CO:(3,4)
3-CO:(7,6,5)
5-VO:(7,6,5,3,4)

(15) 5 4 3 7 9 6
3 2 10 1 4 5 9 6
2 1 11 9 10 3 4 7 8

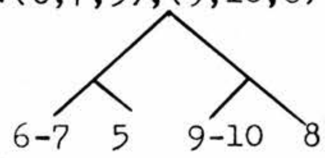
(16) 9 10 1 11 8 6 3 4
9 10 4 3 2 5 1 11 8 7 6
6 7 1 11 4 3 5 2 8 10 9

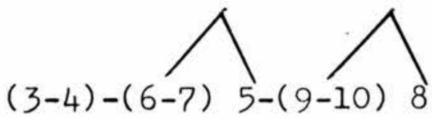
2-CO:(1,11)
2-VO:(9,10),(3,4)

(17) 1 11 3 4 6 7 5 9 10 8 2
1 11 2 3 4 5 6 7 8 9 10
1 11 2 3 4 5 6 7 8 9 10

2-CO:(1,11),(3,4),(6,7),
(9,10)
3-VO:(6,7,5),(9,10,8)

9-CO:





(18) 11 7 6 4 9 10 2 1 3 5 8
11 1 3 4 6 7 9 10 8 5 2
11 7 2 6 1 9 10 3 4 5 8

2-CO:(9,10)
2-VO:(5,8)

(19) 2 10 7 3 4 6 5 8
8 10 3 4 2 11 1 7 6 5
9 10 3 4 2 11 1 7 6 5

2-CO:(3,4),(6,5)

(20) 4 5 8 1 9
2 1 4 5 8 9 7
4 5 1 2 8 9 7 10 6 11

2-CO:(4,5)

(21) 2 1 6 9 8 5 4 11 10
11 10 8 4 6 5 9 2 1 7
11 10 7 8 4 6 5 9 2 1

2-CO:(2,1),(11,10)

(22) 6 3 2 1 8 9
2 4 8 10 6 3 1 11
7 5 6 3 1 11 9 8 10

2-CO:(6,3)

3.3 The t-tests and chi-squared tests (see recall data)

Kowasu (3rd-year junior high school)

Subj. No.	Experimental	Control
1	1	1
2	1	0
3	4	3
4	3	0
5	2	0
6	3	0
7	1	3
8	6	0
9	3	2
10	3	0
11	2	1
12	0	1
13	2	2
14	1	3
15	2	0
16	1	3
17	2	5
18	2	3
19	2	1
20	3	1
21	3	1
22	2	3
Σ	49	33
$\overline{M}$	2.2273	1.5
SD	1.2407	1.4062

$t=1.8192$

Significant ($0.05 < p < 0.1$)

$\chi^2 = 3.122$

Significant ($0.05 < p < 0.1$)

Table 1 Subjective organization

Yaburu (3rd-year junior high school)

Subj. No.	Experimental	Control
1	1	0
2	3	0
3	0	2
4	2	2
5	2	0
6	1	1
7	0	0
8	3	0
9	7	0
10	4	2
11	0	0
12	0	0
13	2	1
14	0	1
15	0	0
16	0	1
17	0	1
18	7	3
19	2	1
20	0	1
Σ	34	16
$\overline{M}$	1.7	0.8
SD	2.1471	0.8718

$\chi^2 = 6.48$

Significant ($0.02 < p < 0.01$)

Table 2 Subjective organization

Yaburu (university group)

Subj. No.	Experimental	Control
1	1	6
2	2	2
3	2	3
4	1	3
5	2	3
6	3	1
7	2	1
8	3	2
9	4	1
10	3	5
11	5	1
12	4	2
13	6	4
14	3	3
15	9	0
16	6	3
17	3	7
18	3	2
19	2	2
20	4	1
21	7	2
22	2	1
Σ	77	55
$\overline{M}$	3.5	2.5
SD	1.9714	1.6989

t=1.80255

Significant ($0.05 < p < 0.1$)

χ^2 =3.6667

Significant ($0.05 < p < 0.1$)

Table 3 Subjective organization

Kowasu (university group)

Subj. No.	Experimental	Control
1	3	5
2	2	3
3	3	7
4	2	5
5	6	2
6	4	2
7	3	2
8	6	0
9	3	3
10	1	1
11	2	0
12	2	1
13	0	1
14	2	0
15	4	1
16	5	0
17	0	0
18	1	1
19	4	1
20	2	4
21	5	0
22	1	1
Σ	61	40
$\overline{M}$	2.7727	1.8182
SD	1.7038	1.8982

$t=2.4824$

Significant ($0.01 < p < 0.02$)

$\chi^2=4.3663$

Significant ($0.02 < p < 0.05$)

Table 4 Subjective organization

TASK NAME KOWARERU

```
METRIC IS EUCLIDEAN        2 DIMENSIONS
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

DHAT IS USED                      # ANGLE FACTOR IS USED                        SFORM 1   HARD SQUEEZE
      GRADIENT ANGLE    RAW STRESS DHAT   STRESS DHAT    RAW STRESS DSTAR COEF.ALIEN DSTAR
 20                       0.89445E 00     0.85977E-01     0.19044E 01      0.12521E 00
```

F I N A L   C O N F I G U R A T I O N

	1	2
1	0.9168	-0.2791
2	-0.2655	0.7072
3	-0.4281	-0.8393
4	-0.2572	-0.5062
5	-0.8423	0.5391
6	-1.3473	0.0985
7	1.0396	-0.1820
8	-0.5927	-0.9598
9	0.5822	0.5088
10	1.1927	-0.1148
11	0.0018	1.0276
MEAN	0.0000	0.0000
SIGMA	0.7908	0.6121

DISTANCES

	1	2	3	4	5	6	7	8	9	10
2	1.5396									
3	1.4569	1.5550								
4	1.1957	1.2134	0.3744							
5	1.9401	0.6008	1.4393	1.1979						
6	2.2953	1.2413	1.3131	1.2466	0.6703					
7	0.1566	1.5791	1.6081	1.3367	2.0153	2.4033				
8	1.6559	1.6988	0.2040	0.5642	1.5196	1.2997	1.8081			
9	0.8560	0.8705	1.6847	1.3171	1.4248	1.9726	0.8285	1.8808		
10	0.3212	1.6739	1.7754	1.5018	2.1375	2.5490	0.1673	1.9753	0.8727	
11	1.5952	0.4173	1.9158	1.5555	0.9752	1.6381	1.5938	2.0745	0.7785	1.6503

Table 1 KOC3

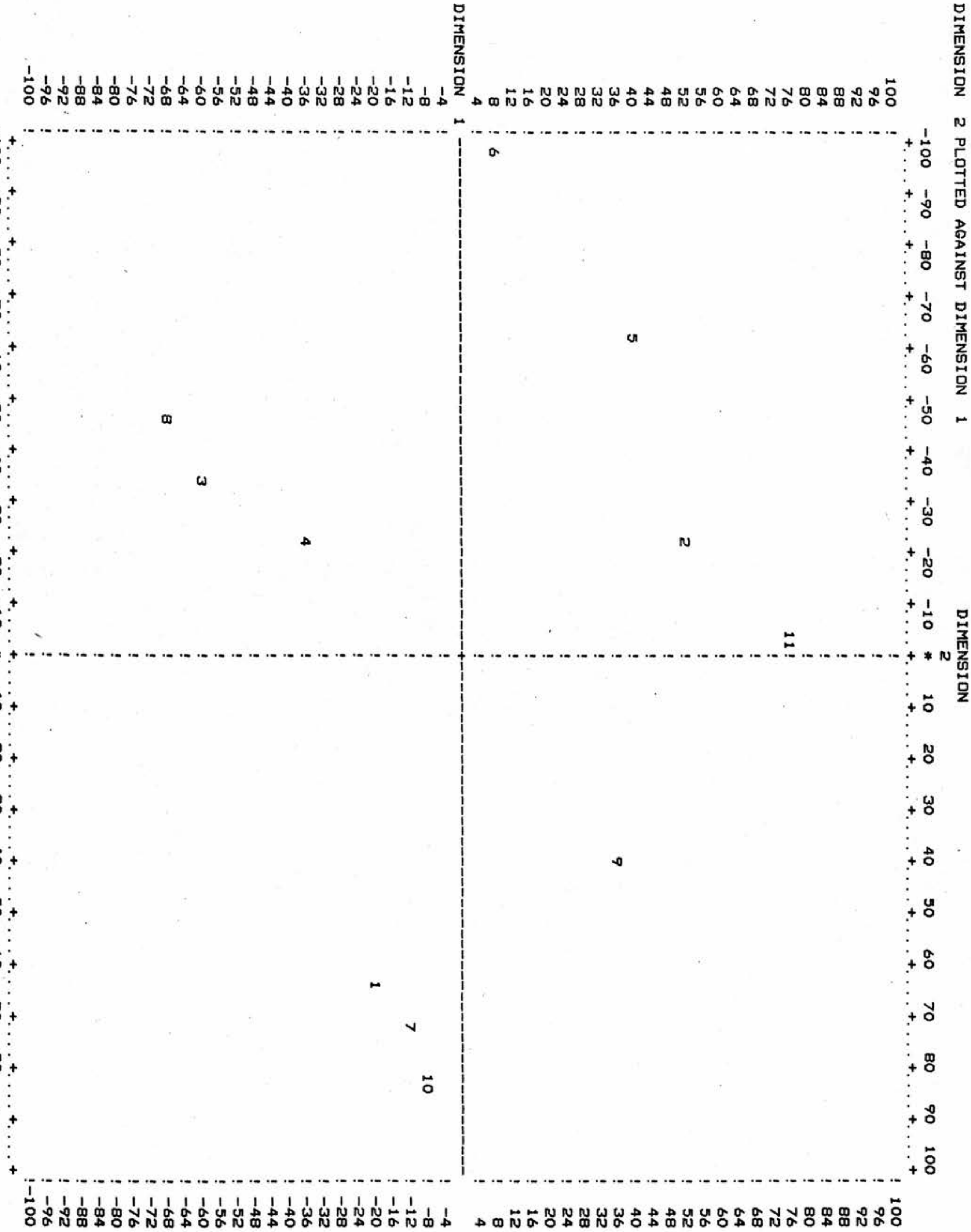

DIMENSION 2 PLOTTED AGAINST DIMENSION 1
DIMENSION 2
DIMENSION 1
120729 KOWA_MKOC3 38K LISTED T42 LP42

Fig. 1 KOC3

METRIC IS EUCLIDEAN 2 DIMENSIONS

* *

DHAT IS USED		# ANGLE FACTOR IS USED			SFORM 1 HARD SQUEEZE
	GRADIENT ANGLE	RAW STRESS DHAT	STRESS DHAT	RAW STRESS DSTAR	COEF. ALIEN DSTAR
23		0.16983E 00	0.37464E-01	0.40219E 00	0.57629E-01

F I N A L C O N F I G U R A T I O N

	1	2
1	-0.9670	-0.1849
2	0.2511	0.7073
3	0.4950	-0.7582
4	0.0614	-0.8771
5	1.0610	0.4817
6	1.2487	0.0124
7	-1.0270	-0.2033
8	0.3853	-0.8950
9	-0.2472	0.6426
10	-1.2021	0.0833
11	-0.0594	0.9911
MEAN	0.0000	0.0000
SIGMA	0.7772	0.6292

DISTANCES

	1	2	3	4	5	6	7	8	9	10
2	1.5099									
3	1.5704	1.4857								
4	1.2396	1.5957	0.4496							
5	2.1347	0.8407	1.3630	1.6869						
6	2.2245	1.2158	1.0779	1.4836	0.5055					
7	0.0628	1.5693	1.6200	1.2800	2.1975	2.2859				
8	1.5274	1.6079	0.1753	0.3244	1.5336	1.2526	1.5725			
9	1.0967	0.5025	1.5853	1.5506	1.3180	1.6232	1.1505	1.6625		
10	0.3566	1.5815	1.8943	1.5870	2.2979	2.4518	0.3359	1.8646	1.1066	
11	1.4855	0.4207	1.8351	1.8721	1.2307	1.6337	1.5372	1.9378	0.3959	1.4594

Table 3 KOU1

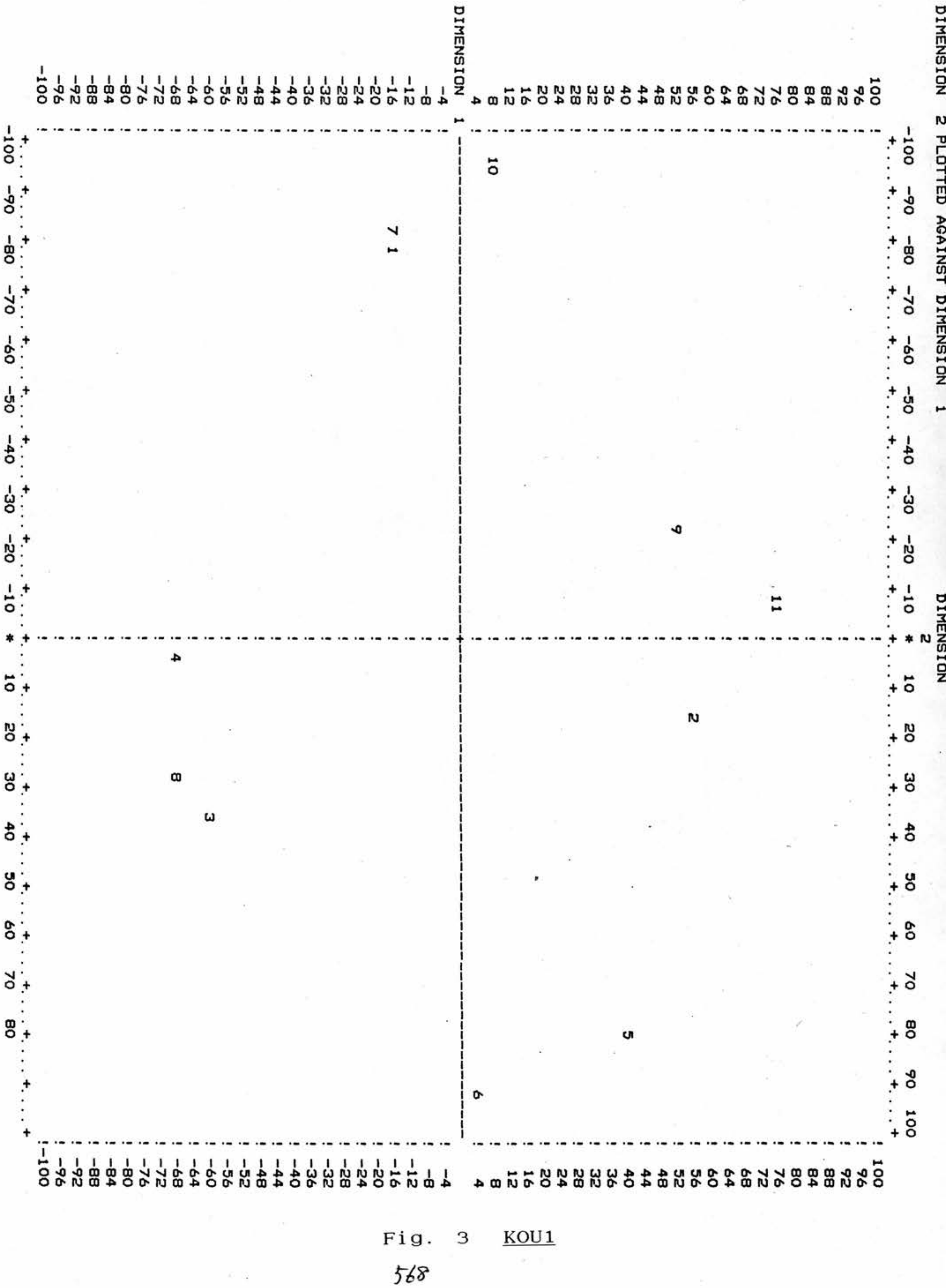

DIMENSION 2 PLOTTED AGAINST DIMENSION 1
DIMENSION 2
DIMENSION 1
120732 KOWA_MKOU1 38K LISTED T42 LP42

Fig. 3 KOU1

METRIC IS EUCLIDEAN 2 DIMENSIONS

* *

DHAT IS USED		# ANGLE FACTOR IS USED			SFORM 1 HARD SQUEEZE
	GRADIENT ANGLE	RAW STRESS DHAT	STRESS DHAT	RAW STRESS DSTAR	COEF. ALIEN DSTAR
123		0.17852E-08	0.42251E-05	0.44333E-08	0.66583E-05

F I N A L C O N F I G U R A T I O N

	1	2
1	-0.5000	0.0000
2	-0.5000	-0.0000
3	-0.5000	-0.0000
4	-0.5000	0.0000
5	2.0000	-0.0000
6	-0.5000	-0.0000
7	-0.5000	-0.0000
8	2.0000	0.0000
9	-0.5000	0.0000
10	-0.5000	0.0000
MEAN	0.0000	0.0000
SIGMA	1.0000	0.0000

DISTANCES

	1	2	3	4	5	6	7	8	9
2	0.0001								
3	0.0000	0.0000							
4	0.0000	0.0000	0.0000						
5	2.5000	2.5000	2.5000	2.5000					
6	0.0001	0.0000	0.0000	0.0000	2.5000				
7	0.0000	0.0000	0.0000	0.0000	2.5000	0.0000			
8	2.5000	2.5000	2.5000	2.5000	0.0000	2.5000	2.5000		
9	0.0000	0.0001	0.0000	0.0000	2.5000	0.0001	0.0000	2.5000	
10	0.0000	0.0000	0.0000	0.0000	2.5000	0.0000	0.0000	2.5000	0.0000

Table 2 YAC3

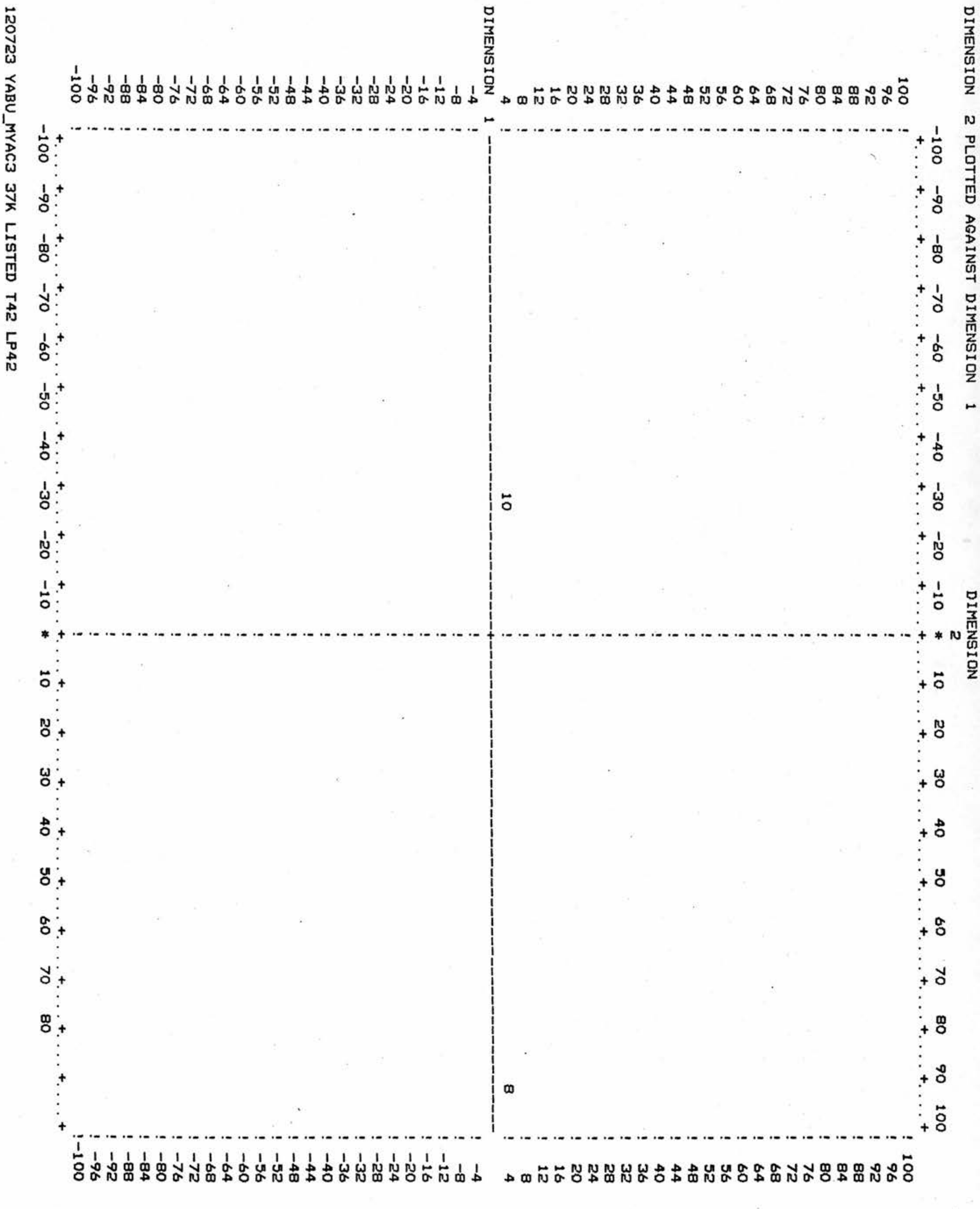

DIMENSION 2 PLOTTED AGAINST DIMENSION 1
DIMENSION 2
DIMENSION 1
10
8
120723 YABU_MYAC3 37K LISTED T42 LP42

Fig. 2 YAC3

METRIC IS EUCLIDEAN 2 DIMENSIONS

* *

DHAT IS USED		# ANGLE FACTOR IS USED			SFORM 1 HARD SQUEEZE
	GRADIENT ANGLE	RAW STRESS DHAT	STRESS DHAT	RAW STRESS DSTAR	COEF. ALIEN DSTAR
35		0. 41211E 00	0. 58360E-01	0. 83537E 00	0. 83018E-01

F I N A L   C O N F I G U R A T I O N

	1	2
1	-0. 9168	-0. 6045
2	-0. 9745	-0. 6524
3	0. 3678	0. 5181
4	-0. 6388	0. 3362
5	-0. 5363	0. 3106
6	1. 5935	-0. 2464
7	0. 4021	0. 6190
8	-0. 0105	-0. 4530
9	1. 7288	-0. 3452
10	-0. 4769	0. 2489
11	-0. 5384	0. 2688
MEAN	-0. 0000	-0. 0000
SIGMA	0. 8959	0. 4443

DISTANCES

	1	2	3	4	5	6	7	8	9	10
2	0. 0750									
3	1. 7060	1. 7810								
4	0. 9809	1. 0440	1. 0229							
5	0. 9911	1. 0580	0. 9276	0. 1057						
6	2. 5358	2. 5999	1. 4447	2. 3071	2. 2015					
7	1. 7991	1. 8739	0. 1066	1. 0787	0. 9878	1. 4725				
8	0. 9189	0. 9844	1. 0422	1. 0088	0. 9271	1. 6173	1. 1487			
9	2. 6583	2. 7207	1. 6118	2. 4637	2. 3581	0. 1675	1. 6401	1. 7427		
10	0. 9601	1. 0295	0. 8866	0. 1839	0. 0856	2. 1289	0. 9538	0. 8428	2. 2844	
11	0. 9517	1. 0192	0. 9398	0. 1210	0. 0419	2. 1933	1. 0036	0. 8942	2. 3489	0. 0646

Table 4 YAU1

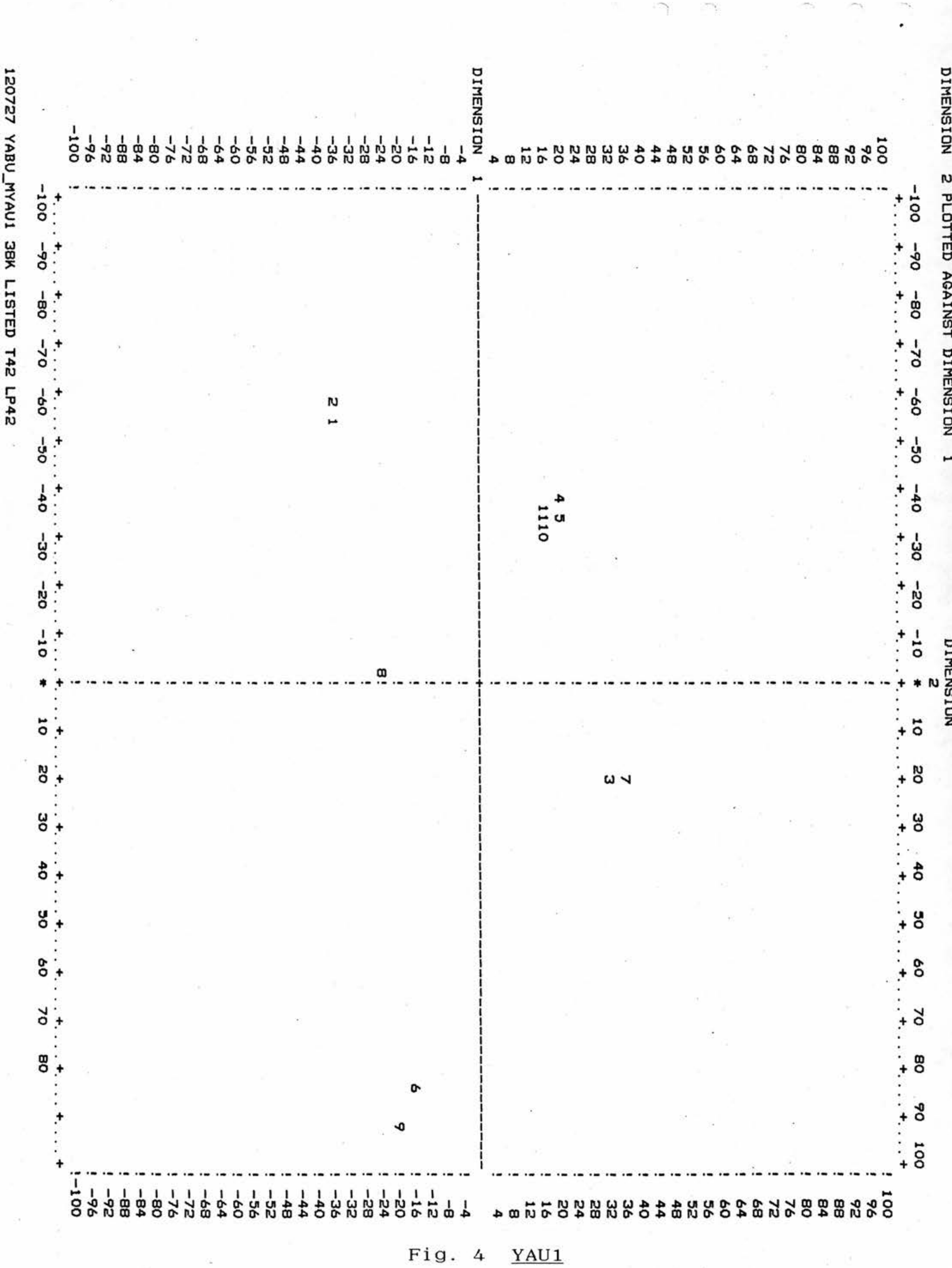
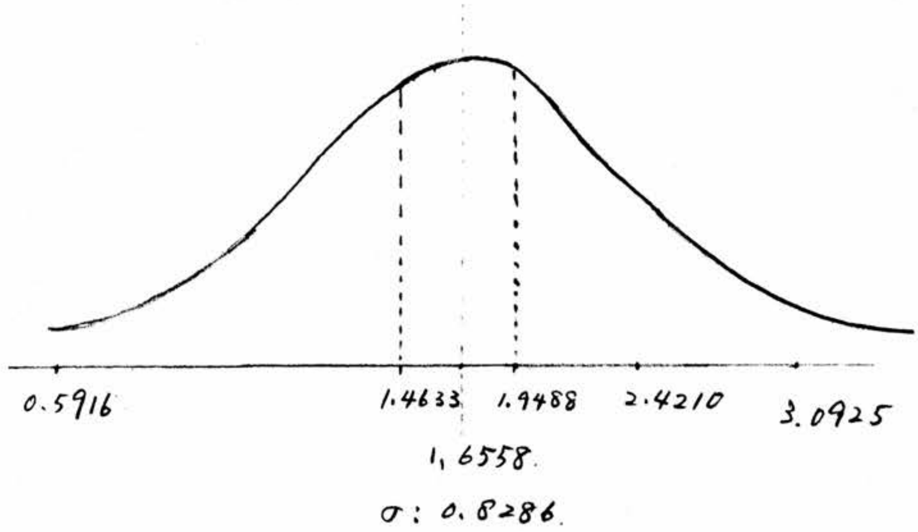

DIMENSION 2 PLOTTED AGAINST DIMENSION 1
DIMENSION 1
DIMENSION 2
120727 YABU_MYAU1 38K LISTED T42 LP42

Fig. 4 <u>YAU1</u>



Some relationship: $T_2 - T_3$

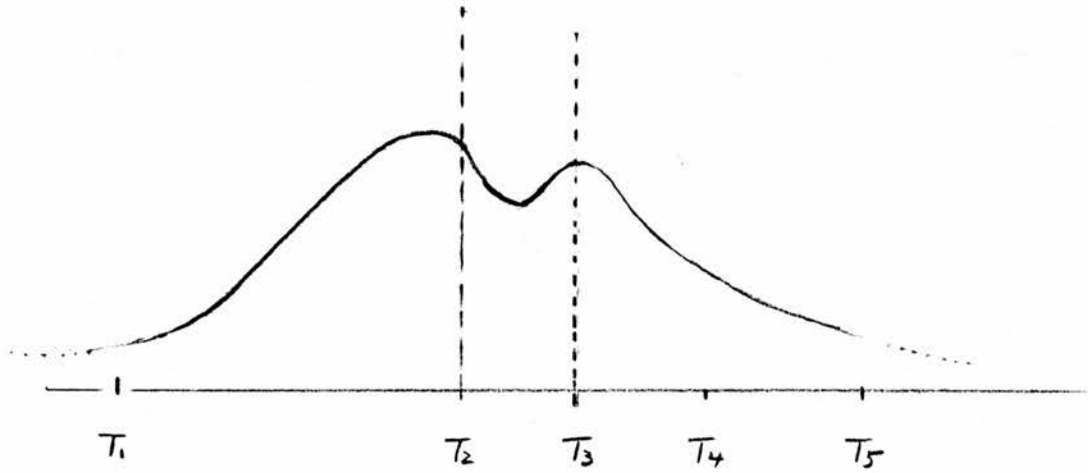


Fig. 9

```
FILE 'TMLIST'
Source: CSAL13.OPTF          Compiled: 14/06/80   16.29.27
Object: OPIF1

Params set: DEFAULTS


      EDINBURGH FORTRAN(O) COMPILER VERSION 50.14


      C     MINIMIZE VALUES ON THE BASIS OF SINGLE TRIAL
            INTEGER N,N1,MAXCAL,IFAIL,I
            REAL*8 TOL,R,F,X(2),SIM(3,2),W1(2),W2(2),W3(2),W4(2),W5(3),X02AAF
            EXTERNAL FUNCT,MONIT
            WRITE (6,99999)
            N = 2
            X(1) = 6.5511
            X(2) = 0.3891
            TOL = SQRT(X02AAF(R))
            N1 = N + 1
            MAXCAL = 200
            IFAIL = 0
            CALL E04CCF(N,X,F,TOL,N1,W1,W2,W3,W4,W5,SIM,
           *FUNCT,MONIT,MAXCAL,IFAIL)
            WRITE (6,99998) F
            WRITE (6,99997) (X(I),I=1,N)
            WRITE (6,99996) IFAIL
            STOP
      C     END OF E04CCF
      99999 FORMAT(23H MOKEI.KIKAKU RESULT T3 )
      99998 FORMAT (25H FINAL FUNCTION VALUE IS,E12.4)
      99997 FORMAT (13H AT THE POINT,2F12.4)
      99996 FORMAT (22H THIS HAS ERROR NUMBER,I3)
            END


            SUBROUTINE FUNCT(N,XC,FC)
            INTEGER N
            REAL*8 XC,FC
            DIMENSION XC(N)
            FC = (XC(1))**2+(XC(2)*1.1985)**2-(12.169351)*XC(1)+
           *(14.564748)*XC(2)-(2.3970)*XC(1)*XC(2)+37.023278
            RETURN
            END


            SUBROUTINE MONIT(FMIN,FMAX,SIM,N,N1,NCALL)
      C     PRINTSOUT VALUES EVERY ITERATION
            INTEGER N,N1,NCALL,J,I
            REAL*8 FMIN,FMAX,SIM
            DIMENSION SIM(N1,N)
            WRITE (6,99995) NCALL,FMIN
            WRITE (6,99994) ((SIM(I,J),J=1,N),I=1,N1)
            RETURN
```

4.1 Examples : the method of optimization

```
990Y3Y UPTFOUT 3K LISTED T40 LF49                RECEIVED 14/08/80 18.39.40

FILE 'OPTFOUT'
 MOKEI,KIKAKU RESULT T3
  AFTER=    9  FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511       0.3891
      7.5511       0.3891
      6.5511       1.3891

  AFTER=   11  FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511       0.3891
      7.5511       0.3891
      6.8011       0.8891

  AFTER=   13  FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511       0.3891
      7.1136       0.5141
      6.8011       0.8891

  AFTER=   15  FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511       0.3891
      6.8948       0.5766
      6.8011       0.8891

  AFTER=   17  FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511       0.3891
      6.8948       0.5766
      6.7620       0.6860

  AFTER=   19  FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511       0.3891
      6.8948       0.5766
      6.7425       0.5844

  AFTER=   21  FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511       0.3891
      6.7708       0.5317
      6.7425       0.5844

  AFTER=   23  FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511       0.3891
      6.7088       0.5072
      6.7425       0.5844

  AFTER=   25  FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511       0.3891
      6.7088       0.5072
      6.6862       0.5168

  AFTER=   27  FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511       0.3891
      6.7088       0.5072
      6.6581       0.4830
```

```
      6.6581         0.4830

   AFTER=    31  FUNCTION CALLS,THE VALUE IS=      0.0000
      6.5511         0.3891
      6.6307         0.4543
      6.6581         0.4830

   AFTER=    33  FUNCTION CALLS,THE VALUE IS=      0.0000
      6.5511         0.3891
      6.6307         0.4543
      6.6245         0.4523

   AFTER=    35  FUNCTION CALLS,THE VALUE IS=      0.0000
      6.5511         0.3891
      6.6307         0.4543
      6.6077         0.4370

   AFTER=    37  FUNCTION CALLS,THE VALUE IS=      0.0000
      6.5511         0.3891
      6.6050         0.4337
      6.6077         0.4370

   AFTER=    39  FUNCTION CALLS,THE VALUE IS=      0.0000
      6.5511         0.3891
      6.6050         0.4337
      6.5929         0.4242

   AFTER=    41  FUNCTION CALLS,THE VALUE IS=      0.0000
      6.5511         0.3891
      6.5885         0.4202
      6.5929         0.4242

   AFTER=    43  FUNCTION CALLS,THE VALUE IS=      0.0000
      6.5511         0.3891
      6.5802         0.4134
      6.5929         0.4242

   AFTER=    45  FUNCTION CALLS,THE VALUE IS=      0.0000
      6.5511         0.3891
      6.5802         0.4134
      6.5773         0.4127

  FINAL FUNCTION VALUE IS,    0.2389D-05
  AT THE POINT          6.5511         0.3891
  THIS HAS ERROR NUMBER  0

 270737 OPTPUT 3K LISTED T40 LP40
```

575

```
FILE 'OPTOUT'
 KIBO,OKIMONO RESULT T1
  AFTER=    9  FUNCTION CALLS,THE VALUE IS=    0.0000
      6.5511       0.4374
      7.5511       0.4374
      6.5511       1.4374

  AFTER=   11  FUNCTION CALLS,THE VALUE IS=    0.0000
      6.5511       0.4374
      7.5511       0.4374
      6.8011       0.9374

  AFTER=   13  FUNCTION CALLS,THE VALUE IS=    0.0000
      6.5511       0.4374
      7.1136       0.5624
      6.8011       0.9374

  AFTER=   15  FUNCTION CALLS,THE VALUE IS=    0.0000
      6.5511       0.4374
      7.1136       0.5624
      6.8167       0.7186

  AFTER=   17  FUNCTION CALLS,THE VALUE IS=    0.0000
      6.5511       0.4374
      6.8968       0.5702
      6.8167       0.7186

  AFTER=   19  FUNCTION CALLS,THE VALUE IS=    0.0000
      6.5511       0.4374
      6.8968       0.5702
      6.7708       0.6112

  AFTER=   21  FUNCTION CALLS,THE VALUE IS=    0.0000
      6.5511       0.4374
      6.7799       0.5473
      6.7708       0.6112

  AFTER=   23  FUNCTION CALLS,THE VALUE IS=    0.0000
      6.5511       0.4374
      6.7204       0.5358
      6.7708       0.6112

  AFTER=   25  FUNCTION CALLS,THE VALUE IS=    0.0000
      6.5511       0.4374
      6.7204       0.5358
      6.7033       0.5489

  AFTER=   27  FUNCTION CALLS,THE VALUE IS=    0.0000
      6.5511       0.4374
      6.6738       0.5145
      6.7033       0.5489

  AFTER=   29  FUNCTION CALLS,THE VALUE IS=    0.0000
      6.5511       0.4374
```

```
      6.6748        0.5145
      6.6579        0.5124

 AFTER=    31   FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511        0.4374
      6.6371        0.4747
      6.6579        0.5124

 AFTER=    33   FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511        0.4374
      6.6371        0.4747
      6.6265        0.4892

 AFTER=    35   FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511        0.4374
      6.6140        0.4790
      6.6265        0.4892

 AFTER=    37   FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511        0.4374
      6.6140        0.4790
      6.6045        0.4737

 AFTER=    39   FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511        0.4374
      6.5959        0.4673
      6.6045        0.4737

 AFTER=    41   FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511        0.4374
      6.5959        0.4673
      6.5890        0.4630

 AFTER=    43   FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511        0.4374
      6.5759        0.4673
      6.5813        0.4577

 AFTER=    45   FUNCTION CALLS,THE VALUE IS=     0.0000
      6.5511        0.4374
      6.5810        0.4574
      6.5813        0.4577

FINAL FUNCTION VALUE IS,  0.2160D-05
AT THE POINT       6.5511       0.4374
THIS HAS ERROR NUMBER  0

070743 OPTOUUT 3K LISTED T40 LP40
```

5.1 Data elicited by the Japanese and Englich scales

Kowasu

Subj.		radio		body		negotiation		mood	
		J	E	J	E	J	E	J	E
1	basic/non-basic	1	1	5	2	6	5	3	
	con/abs	3	3	6	5	7	6	5	
2	basic/non-basic	1	1	2	3	6	4	5	
	con/abs	1	2	2	3	7	5	4	
3	basic/non-basic	1	1	2	3	6	4	3	
	con/abs	1	1	2	3	5	4	3	
4	basic/non-basic	1	1	6	5	6	6	7	
	con/abs	2	1	2	1	2	1	2	
5	basic/non-basic	1	1	2	2	5	7	6	
	con/abs	1	1	3	4	6	7	7	
6	basic/non-basic	1	1	2	2	7	6	3	
	con/abs	1	1	3	2	7	6	2	
7	basic/non-basic	2	1	5	5	7	7	6	
	con/abs	2	3	5	5	7	3	3	
8	basic/non-basic	1	1	6	3	7	7	2	
	con/abs	1	1	6	4	5	6	2	
9	basic/non-basic	1	1	4	6	5	4	6	
	con/abs	1	1	6	5	5	6	4	
10	basic/non-basic	1	1	3	3	5	5	6	
	con/abs	1	1	1	3	5	4	2	
11	basic/non-basic	1	1	3	4	7	7	1	
	con/abs	1	1	3	4	5	7	7	
12	basic/non-basic	1	1	5	5	3	3	1	
	con/abs	1	1	3	3	5	5	1	

Kowasu

Subj.		radio		body		negotiation		mood	
		J	E	J	E	J	E	J	E
13	basic/non-basic	1	1	5	5	3	4	7	
	con/abs	1	1	4	5	3	4	7	
14	basic/non-basic	1	1	5	5	5	5	6	
	con/abs	1	1	1	1	5	5	1	
15	basic/non-basic	1	1	1	6	4	5	1	
	con/abs	1	1	5	6	4	4	6	
16	basic/non-basic	1	1	1	5	2	2	3	
	con/abs	1	1	1	4	4	3	1	
17	basic/non-basic	1	5	2	5	6	6	3	
	con/abs	1	5	2	5	5	5	3	
18	basic/non-basic	1	1	3	5	5	4	7	
	con/abs	1	1	1	5	3	3	1	
19	basic/non-basic	1	1	5	1	4	2	5	
	con/abs	1	1	4	6	4	6	6	
20	basic/non-basic	2	1	4	5	4	4	4	
	con/abs	1	1	1	2	2	4	4	
21	basic/non-basic	1	1	3	3	4	4	5	
	con/abs	1	1	3	3	6	5	2	
22	basic/non-basic	1	1	4	5	2	2	5	
	con/abs	1	1	4	5	2	2	5	
23	basic/non-basic	1	3	4	7	6	4	6	
	con/abs	1	2	5	4	6	7	2	
24	basic/non-basic	1	1	3	6	6	4	2	
	con/abs	1	1	5	3	5	3	5	

Kowasu

Subj.		radio		body		negotiation		mood	
		J	E	J	E	J	E	J	E
25	basic/non-basic	1	3	5	5	5	2	6	
	con/abs	1	3	5	5	5	6	3	
26	basic/non-basic	1	6	1	5	3	5	1	
	con/abs	1	5	1	5	3	3	2	
27	basic/non-basic	1	1	1	2	1	3	1	
	con/abs	1	2	1	4	4	4	1	
28	basic/non-basic	1	1	1	1	1	3	2	
	con/abs	1	1	3	2	4	4	1	
29	basic/non-basic	1	1	1	1	2	5	1	
	con/abs	1	1	6	4	6	4	1	
30	basic/non-basic	2	1	2	5	5	6	3	
	con/abs	2	1	5	5	6	6	4	
31	basic/non-basic	1	2	3	3	3	5	5	
	con/abs	1	2	2	6	4	5	2	
32	basic/non-basic	1	1	5	2	2	4	6	
	con/abs	1	1	3	3	3	4	2	
33	basic/non-basic	1	2	3	5	4	3	1	
	con/abs	1	2	5	4	4	4	3	
34	basic/non-basic	1	1	1	2	4	4	3	
	con/abs	1	1	3	3	6	6	6	
35	basic/non-basic	1	1	2	3	4	5	3	
	con/abs	1	1	2	2	5	5	4	

5.1 Data elicited by the Japanese and Englich scales

Yaburu

Subj.		paper		silence		record		heart	
		J	E	J	E	J	E	J	E
1	basic/non-basic	3	2	7	7	6	6	4	5
	con/abs	1	1	3	3	5	7	6	6
2	basic/non-basic	1	1	5	4	2	3	6	6
	con/abs	1	2	1	7	4	4	7	2
3	basic/non-basic	2	1	4	2	1	2	7	2
	con/abs	1	1	4	3	2	2	7	3
4	basic/non-basic	1	1	4	3	5	6	6	5
	con/abs	1	1	2	1	2	1	5	2
5	basic/non-basic	1	1	6	6	3	3	7	7
	con/abs	1	2	4	4	2	1	6	3
6	basic/non-basic	1	1	3	4	2	2	6	3
	con/abs	1	1	2	3	3	2	6	4
7	basic/non-basic	2	1	5	5	4	4	7	4
	con/abs	3	1	6	6	6	6	7	6
8	basic/non-basic	1	1	2	4	1	2	7	3
	con/abs	1	1	2	3	1	2	5	2
9	basic/non-basic	1	1	3	4	2	3	6	5
	con/abs	1	1	6	6	2	2	7	5
10	basic/non-basic	1	2	5	5	4	4	7	6
	con/abs	1	2	1	6	1	2	3	6
11	basic/non-basic	1	1	1	3	7	7	6	5
	con/abs	1	1	7	7	6	6	5	7
12	basic/non-basic	1	1	7	7	1	1	6	7
	con/abs	1	1	1	7	6	6	2	6

Yaburu

Subj.		paper		silence		record		heart	
		J	E	J	E	J	E	J	E
13	basic/non-basic	1	1	6	6	4	4	5	7
	con/abs	1	1	7	6	3	1	6	7
14	basic/non-basic	2	1	4	7	5	7	5	7
	con/abs	1	1	1	1	2	1	5	4
15	basic/non-basic	1	1	1	2	1	1	1	1
	con/abs	1	1	5	5	6	6	7	6
16	basic/non-basic	1	1	3	3	3	2	4	4
	con/abs	1	1	1	4	1	1	4	4
17	basic/non-basic	1	1	5	3	4	3	7	5
	con/abs	1	1	6	3	4	3	7	4
18	basic/non-basic	1	1	7	2	5	6	6	3
	con/abs	1	1	1	1	6	6	5	5
19	basic/non-basic	1	1	6	6	6	2	6	6
	con/abs	1	1	6	6	6	2	6	6
20	basic/non-basic	2	3	4	3	6	2	3	4
	con/abs	1	3	2	4	2	3	4	4
21	basic/non-basic	1	1	2	3	3	3	3	6
	con/abs	1	1	2	3	3	3	5	4
22	basic/non-basic	1	1	6	6	1	1	6	6
	con/abs	1	1	6	6	5	5	6	6
23	basic/non-basic	1	2	5	6	4	4	7	5
	con/abs	1	2	6	6	3	2	6	6
24	basic/non-basic	1	1	4	5	3	5	7	5
	con/abs	1	2	6	4	5	5	6	5

Yaburu

Subj.		paper		silence		record		heart	
		J	E	J	E	J	E	J	E
25	basic/non-basic	1	1	6	3	3	2	6	6
	con/abs	1	2	6	3	3	2	6	2
26	basic/non-basic	1	2	3	1	2	2	6	3
	con/abs	1	2	5	1	2	3	6	2
27	basic/non-basic	1	1	2	4	1	1	7	4
	con/abs	1	2	1	5	1	2	7	5
28	basic/non-basic	1	1	1	1	1	1	2	1
	con/abs	1	1	3	2	1	1	4	3
29	basic/non-basic	1	1	1	1	1	1	1	1
	con/abs	1	2	7	7	2	3	7	7
30	basic/non-basic	1	1	3	6	2	5	3	5
	con/abs	2	1	7	6	5	6	4	6
31	basic/non-basic	1	2	4	2	2	2	6	3
	con/abs	1	2	2	5	2	3	6	6
32	basic/non-basic	1	1	6	2	4	2	7	1
	con/abs	1	1	5	3	3	2	6	2
33	basic/non-basic	1	2	3	5	2	4	5	5
	con/abs	1	2	4	4	2	3	6	5
34	basic/non-basic	1	1	4	4	2	3	5	7
	con/abs	1	1	5	4	3	3	7	7
35	basic/non-basic	1	2	6	5	3	3	4	4
	con/abs	1	2	4	6	3	5	5	7

Kudaku

Subj.		clay		wind		spirit		concept	
		J	E	J	E	J	E	J	E
1	basic/non-basic	1	2	7	7	3	1	6	5
	con/abs	1	1	3	3	4	7	7	6
2	basic/non-basic	1	1	5	4	2	3	6	6
	con/abs	1	2	4	7	6	6	7	7
3	basic/non-basic	2	2	6	4	5	2	3	3
	con/abs	2	1	6	4	5	3	4	4
4	basic/non-basic	1	1	7	5	5	4	2	3
	con/abs	1	1	7	6	3	2	2	4
5	basic/non-basic	1	1	6	6	7	3	2	7
	con/abs	1	1	7	6	2	2	4	6
6	basic/non-basic	1	1	4	4	7	2	5	3
	con/abs	1	1	5	3	6	2	3	4
7	basic/non-basic	1	2	5	7	2	2	3	4
	con/abs	2	3	7	4	7	5	6	6
8	basic/non-basic	1	2	4	5	7	7	5	6
	con/abs	1	2	5	4	5	3	2	7
9	basic/non-basic	1	1	4	5	6	6	3	4
	con/abs	1	1	6	5	7	6	3	4
10	basic/non-basic	1	1	7	6	6	7	5	5
	con/abs	2	2	6	6	3	3	4	5
11	basic/non-basic	1	1	6	7	7	7	2	3
	con/abs	1	1	4	5	7	7	5	5
12	basic/non-basic	1	1	7	7	2	7	7	6
	con/abs	1	1	7	7	2	7	7	6

Kudaku

Subj.		clay		wind		spirit		concept	
		J	E	J	E	J	E	J	E
13	basic/non-basic	1	1	6	4	7	5	5	3
	con/abs	1	1	6	4	7	5	5	3
14	basic/non-basic	4	1	5	5	5	5	5	5
	con/abs	2	1	5	4	4	4	2	3
15	basic/non-basic	1	1	6	5	4	7	7	6
	con/abs	1	1	5	5	4	7	6	6
16	basic/non-basic	1	3	7	6	5	4	3	3
	con/abs	1	2	7	3	5	4	4	4
17	basic/non-basic	1	2	7	6	6	6	3	3
	con/abs	1	2	7	6	6	6	3	3
18	basic/non-basic	1	3	5	6	6	5	2	2
	con/abs	1	2	4	3	5	7	1	3
19	basic/non-basic	1	1	5	5	6	6	6	6
	con/abs	1	1	5	5	6	6	6	6
20	basic/non-basic	4	3	4	4	3	1	7	6
	con/abs	2	3	6	6	7	6	7	6
21	basic/non-basic	1	1	2	2	5	5	4	4
	con/abs	1	1	2	3	6	5	4	4
22	basic/non-basic	1	1	6	6	5	6	6	6
	con/abs	1	1	6	6	5	6	6	6
23	basic/non-basic	1	3	6	5	7	7	5	3
	con/abs	1	2	4	6	6	6	4	3
24	basic/non-basic	3	2	7	5	7	5	2	3
	con/abs	1	3	6	5	6	6	5	4

Kudaku

Subj.		clay		wind		spirit		concept	
		J	E	J	E	J	E	J	E
25	basic/non-basic	1	3	7	4	7	4	7	4
	con/abs	1	2	7	4	7	4	7	3
26	basic/non-basic	2	4	6	6	6	7	5	5
	con/abs	2	2	6	5	6	7	5	5
27	basic/non-basic	1	5	6	6	7	3	3	6
	con/abs	1	5	6	7	6	5	3	5
28	basic/non-basic	1	2	7	7	7	7	2	2
	con/abs	2	2	6	6	6	6	3	3
29	basic/non-basic	1	1	7	6	6	6	5	6
	con/abs	1	1	7	6	5	6	6	6
30	basic/non-basic	2	2	7	6	6	6	3	3
	con/abs	3	2	7	6	6	6	6	5
31	basic/non-basic	2	5	7	7	7	7	5	6
	con/abs	3	4	7	7	6	7	5	6
32	basic/non-basic	1	1	5	6	6	6	4	3
	con/abs	1	1	5	4	5	5	4	6
33	basic/non-basic	2	3	6	5	4	4	4	3
	con/abs	1	2	6	6	6	5	6	4
34	basic/non-basic	1	1	3	3	4	6	4	6
	con/abs	1	1	3	3	5	5	5	7
35	basic/non-basic	1	1	3	2	5	6	6	5
	con/abs	1	1	4	3	5	5	6	4

Oru

Subj.		leg		conversation		ego		nose	
		J	E	J	E	J	E	J	E
1	basic/non-basic	1	1	7	2	6	5	5	7
	con/abs	1	2	2	3	3	5	7	7
2	basic/non-basic	1	1	3	3	4	4	7	6
	con/abs	1	3	3	4	5	5	6	7
3	basic/non-basic	1	2	4	2	6	5	7	3
	con/abs	1	1	3	2	6	5	7	3
4	basic/non-basic	1	1	3	4	6	6	6	5
	con/abs	1	2	3	2	3	3	2	2
5	basic/non-basic	1	1	7	5	6	6	3	2
	con/abs	1	1	7	6	5	7	2	2
6	basic/non-basic	1	1	4	5	5	6	3	3
	con/abs	1	1	6	6	7	7	6	3
7	basic/non-basic	2	1	7	3	7	6	7	2
	con/abs	1	1	7	5	7	7	7	3
8	basic/non-basic	1	3	7	2	7	7	7	3
	con/abs	1	1	2	6	7	7	5	4
9	basic/non-basic	1	1	5	7	7	6	3	2
	con/abs	1	1	7	6	6	5	6	7
10	basic/non-basic	1	1	6	4	7	6	6	6
	con/abs	1	1	2	2	7	5	2	4
11	basic/non-basic	1	1	7	7	2	1	1	1
	con/abs	1	1	7	7	5	4	7	7
12	basic/non-basic	1	1	1	5	3	3	4	6
	con/abs	1	1	2	5	4	3	5	5

Oru

Subj.		leg		conversation		ego		nose	
		J	E	J	E	J	E	J	E
13	basic/non-basic	1	1	6	6	7	7	7	7
	con/abs	1	1	6	6	7	7	7	7
14	basic/non-basic	2	1	5	5	6	5	5	5
	con/abs	1	1	2	2	4	5	5	4
15	basic/non-basic	1	1	1	1	2	1	2	4
	con/abs	1	1	7	5	6	6	7	6
16	basic/non-basic	1	1	6	6	3	3	5	3
	con/abs	1	1	7	5	3	3	3	4
17	basic/non-basic	1	3	6	6	5	7	7	5
	con/abs	1	2	5	5	7	6	4	4
18	basic/non-basic	1	1	6	7	5	5	7	4
	con/abs	1	1	4	5	5	5	6	5
19	basic/non-basic	1	1	7	6	7	6	7	6
	con/abs	1	1	7	6	6	6	5	6
20	basic/non-basic	2	3	7	6	7	5	7	6
	con/abs	2	3	7	6	7	5	7	4
21	basic/non-basic	1	1	3	3	4	3	5	4
	con/abs	1	1	3	3	6	4	5	4
22	basic/non-basic	1	1	7	6	4	3	7	6
	con/abs	1	1	7	6	4	3	7	6
23	basic/non-basic	1	3	5	6	6	6	7	6
	con/abs	1	2	5	4	6	6	6	7
24	basic/non-basic	1	1	7	5	7	6	4	4
	con/abs	1	1	6	5	5	6	7	4

Oru

Subj.		leg		conversation		ego		nose	
		J	E	J	E	J	E	J	E
25	basic/non-basic	1	1	6	5	6	5	7	6
	con/abs	1	3	6	4	6	6	6	4
26	basic/non-basic	1	1	6	7	7	7	5	5
	con/abs	1	1	6	4	6	7	7	7
27	basic/non-basic	1	1	6	2	2	3	7	6
	con/abs	1	2	5	3	2	2	6	6
28	basic/non-basic	2	2	2	2	7	5	2	2
	con/abs	3	1	4	3	7	2	6	2
29	basic/non-basic	1	1	2	1	4	3	2	2
	con/abs	1	1	6	6	7	6	7	6
30	basic/non-basic	1	2	4	5	6	6	3	7
	con/abs	1	1	6	5	6	7	6	6
31	basic/non-basic	1	2	6	4	7	7	7	6
	con/abs	1	1	6	5	7	6	5	6
32	basic/non-basic	1	1	6	3	6	6	7	6
	con/abs	1	1	5	4	6	6	6	6
33	basic/non-basic	1	1	6	5	4	4	2	4
	con/abs	1	1	6	5	4	4	4	3
34	basic/non-basic	1	1	3	3	7	5	7	7
	con/abs	1	1	4	5	7	5	7	7
35	basic/non-basic	2	2	4	5	5	7	6	4
	con/abs	2	2	6	5	5	6	7	7

5.2 The Wilcoxon matched pairs signed-ranks test

<u>Kowasu</u>

	T	N	
(radio)			
basic/non-basic	9	9	N.S.
con/abs	9	11	N.S.
(health)			
basic/non-basic	90.5	23	N.S.
con/abs	102	26	N.S.
(negotiation)			
basic/non-basic	107.5	22	N.S.
con/abs	119.5	22	N.S.

Table 1

<u>Yaburu</u>

	T	N	
(paper)			
basic/non-basic	24	11	N.S.
con/abs	21.5	15	N.S.
(silence)			
basic/non-basic	131	23	N.S
con/abs	21.5	15	N.S.
(record)			
basic/non-basic	62	17	N.S.
con/abs	112	21	N.S.
(heart)			
basic/non-basic	80.5	25	N.S.
con/abs	78	25	N.S.

Table 2

Kudaku

	T	N	
(clay)			
basic/non-basic	23.5	16	N.S.
con/abs	22.5	16	N.S.
(wind)			
basic/non-basic	58	21	N.S.
con/abs	66	24	N.S.
(spirit)			
basic/non-basic	65.5	19	N.S.
con/abs	71	21	N.S.
(concept)			
basic/non-basic	129	18	N.S.
con/abs	105	18	N.S.

Table 3

Oru

	T	N	
(leg)			
basic/non-basic	7	9	N.S.
con/abs	8	9	N.S.
(conversation)			
basic/non-basic	655	24	N.S.
con/abs	103	27	N.S.
(ego)			
basic/non-basic	55	21	N.S.
con/abs	68	20	N.S.
(nose)			
basic/non-basic	91	25	N.S.
con/abs	60.5	22	N.S.

Table 4

5.3 The t-tests

T-test

Kowasu

	F		t	
(radio)				
basic/non-basic	16.2500		1.7446	N.S.
con/abs	6.1546		2.0877	N.S.
(health)				
basic/non-basic	1.0453	N.S.	0.9354	N.S.
con/abs	1.56715	N.S.	2.2237	N.S.
(negotiation)				
basic/non-basic	1.4116	N.S.	0.0784	N.S.
con/abs	1.014876	N.S.	0.3038	N.S.

Table 1

Yaburu

	F		t	
(paper)				
basic/non-basic	1.2459	N.S.	0.9062	N.S.
con/abs	1.6627	N.S.	3.3789	sig.
(silence)				
basic/non-basic	1.03221	N.S.	0.3198	N.S.
con/abs	1.2148	N.S.	2.4975	N.S.
(record)				
basic/non-basic	1.0453	N.S.	0.2495	N.S.
con/abs	1.0179	N.S.	0.0814	N.S.
(heart)				
basic/non-basic	1.1870	N.S.	1.8241	N.S.
con/abs	1.4429	N.S.	2.6277	sig.

Table 2

Kudaku

5.3 The t-tests

	F		t	
(clay)				
basic/non-basic	1.8479	N.S.	2.4066	N.S.
con/abs	2.6980	sig.	2.1428	
(wind)				
basic/non-basic	1.0527	N.S.	2.1480	N.S.
con/abs	1.0246	N.S.	2.4859	N.S.
(spirit)				
basic/non-basic	1.4189	N.S.	1.2535	N.S.
con/abs	1.2862	N.S.	0.5024	N.S.
(concept)				
basic/non-basic	1.2691	N.S.	0.1865	N.S.
con/abs	1.8088	N.S.	0.7651	N.S.

Table 3

Oru

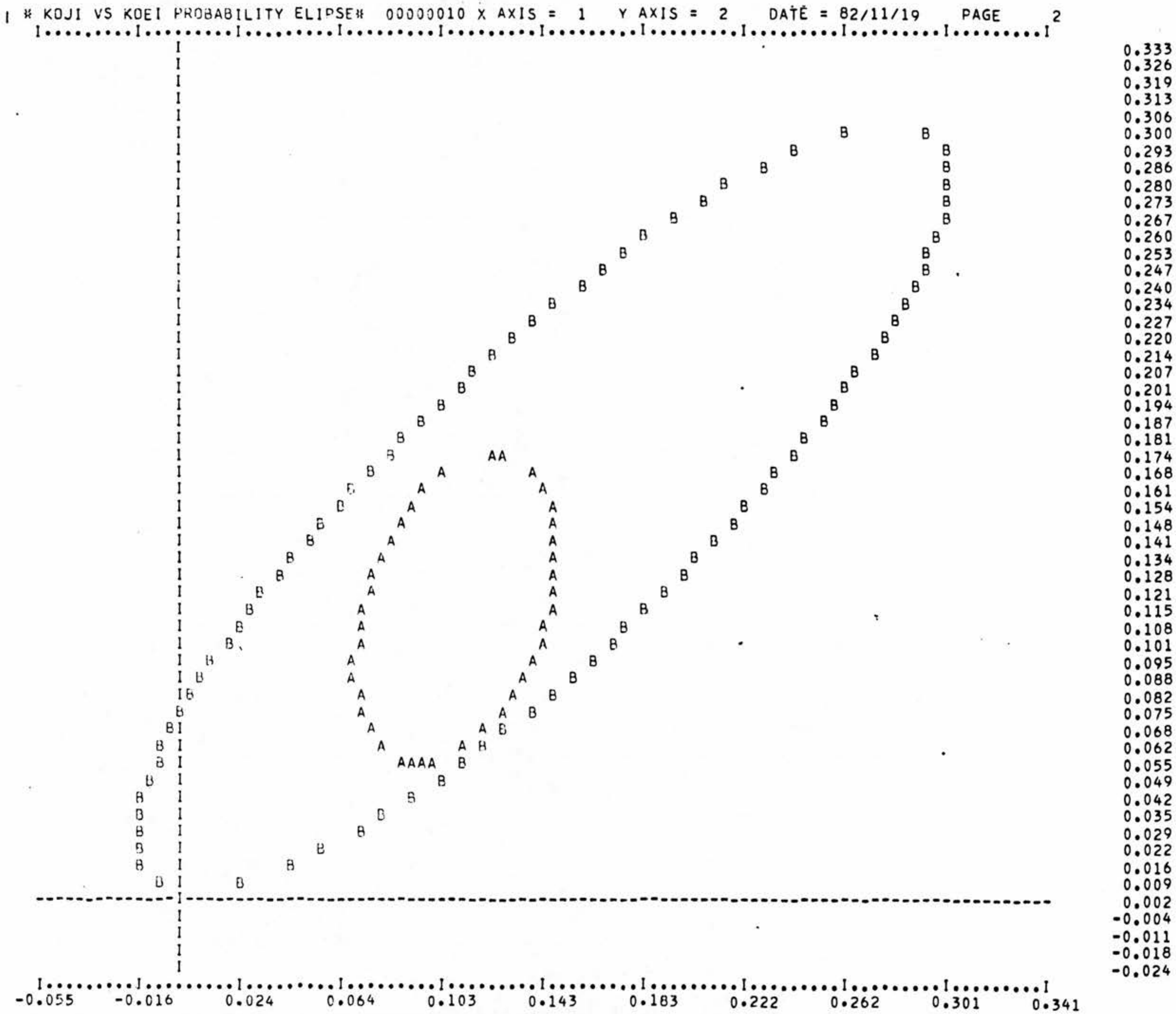
	F		t	
(leg)				
basic/non-basic	3.7733	sig.	2.1141	N.S.
con/abs	2.5052	sig.	1.8150	N.S.
(conversation)				
basic/non-basic	1.0575	N.S.	1.9033	N.S.
con/abs	1.7063	N.S.	1.4486	N.S.
(ego)				
basic/non-basic	1.0265	N.S.	1.2351	N.S.
con/abs	1.0715	N.S.	1.2024	N.S.
(nose)				
basic/non-basic	1.2901	N.S.	1.7778	N.S.
con/abs	1.2017	N.S.	2.0728	N.S.

Table 4

* KOJI VS KOEI PROBABILITY ELIPSE* 00000010 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 1

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
KOJ1	A		0.109	0.028	0.114	0.042	0.3785	0.250	0.573	0.38	-2.63	0.06	0.04
KOE1	B		0.143	0.113	0.154	0.105	0.8635	0.927	0.804	1.09	-0.92	0.21	0.06

Table 1

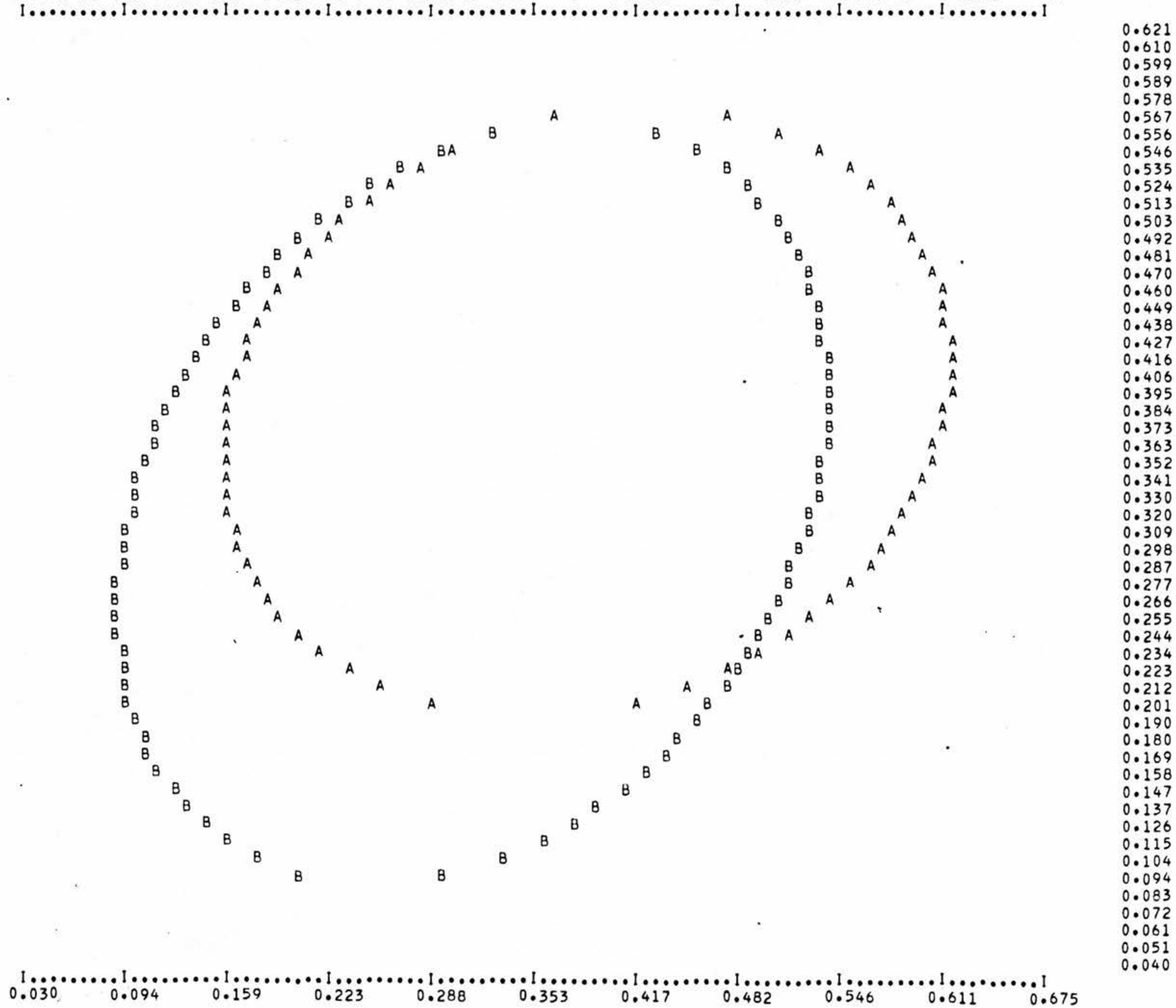

* KOJI VS KOEI PROBABILITY ELIPSE* 00000010 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 2
0.333
0.326
0.319
0.313
0.306
0.300
0.293
0.286
0.280
0.273
0.267
0.260
0.253
0.247
0.240
0.234
0.227
0.220
0.214
0.207
0.201
0.194
0.187
0.181
0.174
0.168
0.161
0.154
0.148
0.141
0.134
0.128
0.121
0.115
0.108
0.101
0.095
0.088
0.082
0.075
0.068
0.062
0.055
0.049
0.042
0.035
0.029
0.022
0.016
0.009
0.002
-0.004
-0.011
-0.018
-0.024
-0.055
-0.016
0.024
0.064
0.103
0.143
0.183
0.222
0.262
0.301
0.341

3

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
KOE2	A		0.386	0.162	0.383	0.134	0.1593	0.193	0.132	2.77	-0.36	0.24	0.18
KOJ2	B		0.314	0.159	0.326	0.168	0.2862	0.271	0.303	0.82	-1.21	0.26	0.19

4

2 * KOJI VS KOEI PROBABILITY ELIPSE * 00000000 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 2



597

* KOJI VS KOEI PROBABILITY ELIPSE * 00000010 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 1

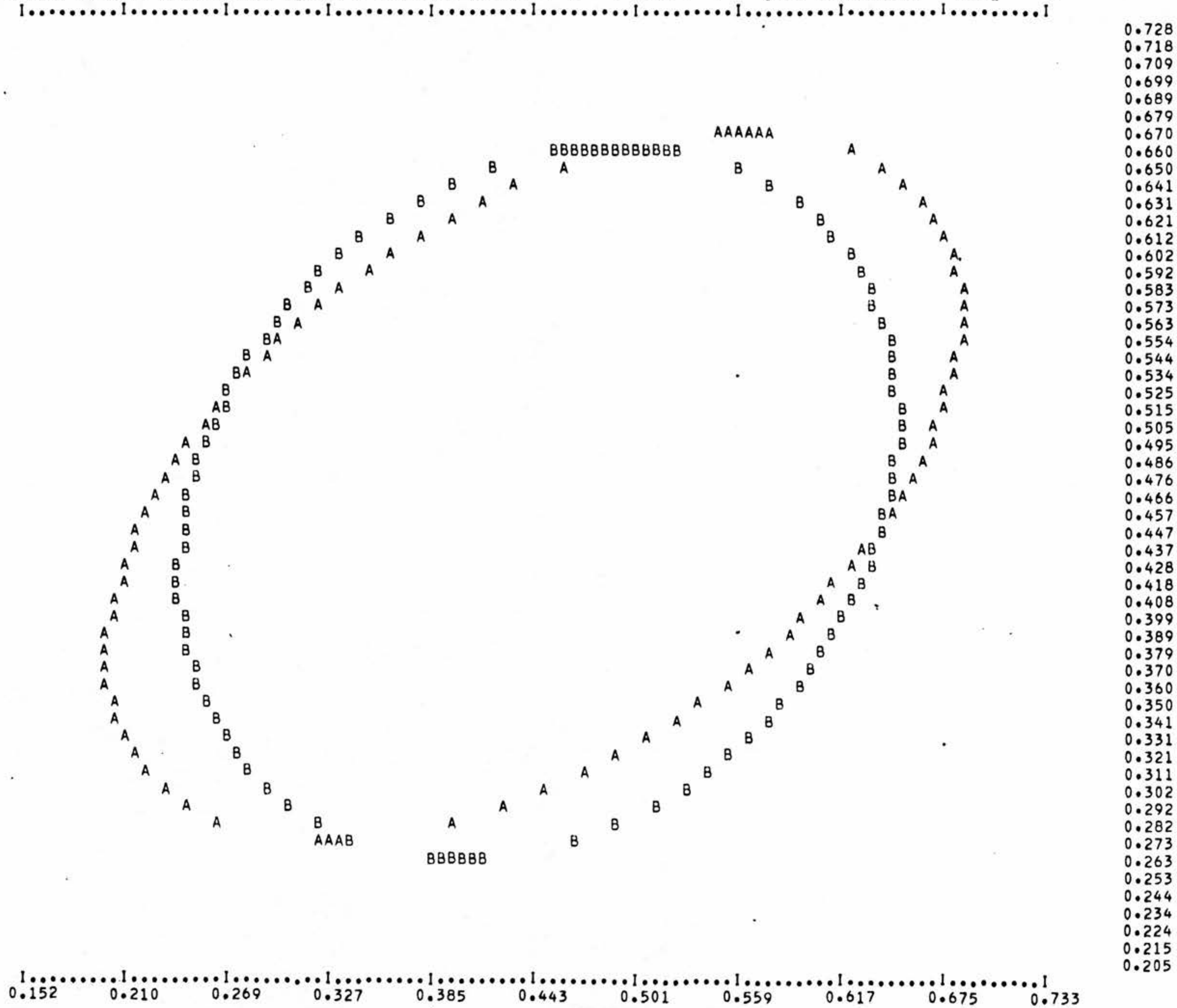
5

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
KOJ3	A	.	0.443	0.171	0.471	0.141	0.4902	0.597	0.403	1.48	-0.67	0.27	0.15
KOE3 ·	B		0.446	0.144	0.463	0.142	0.2232	0.227	0.219	1.08	-0.92	0.22	0.18

598

3 * KOJI VS KOEI PROBABILITY ELIPSE * 00000010 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 2

6



599

7

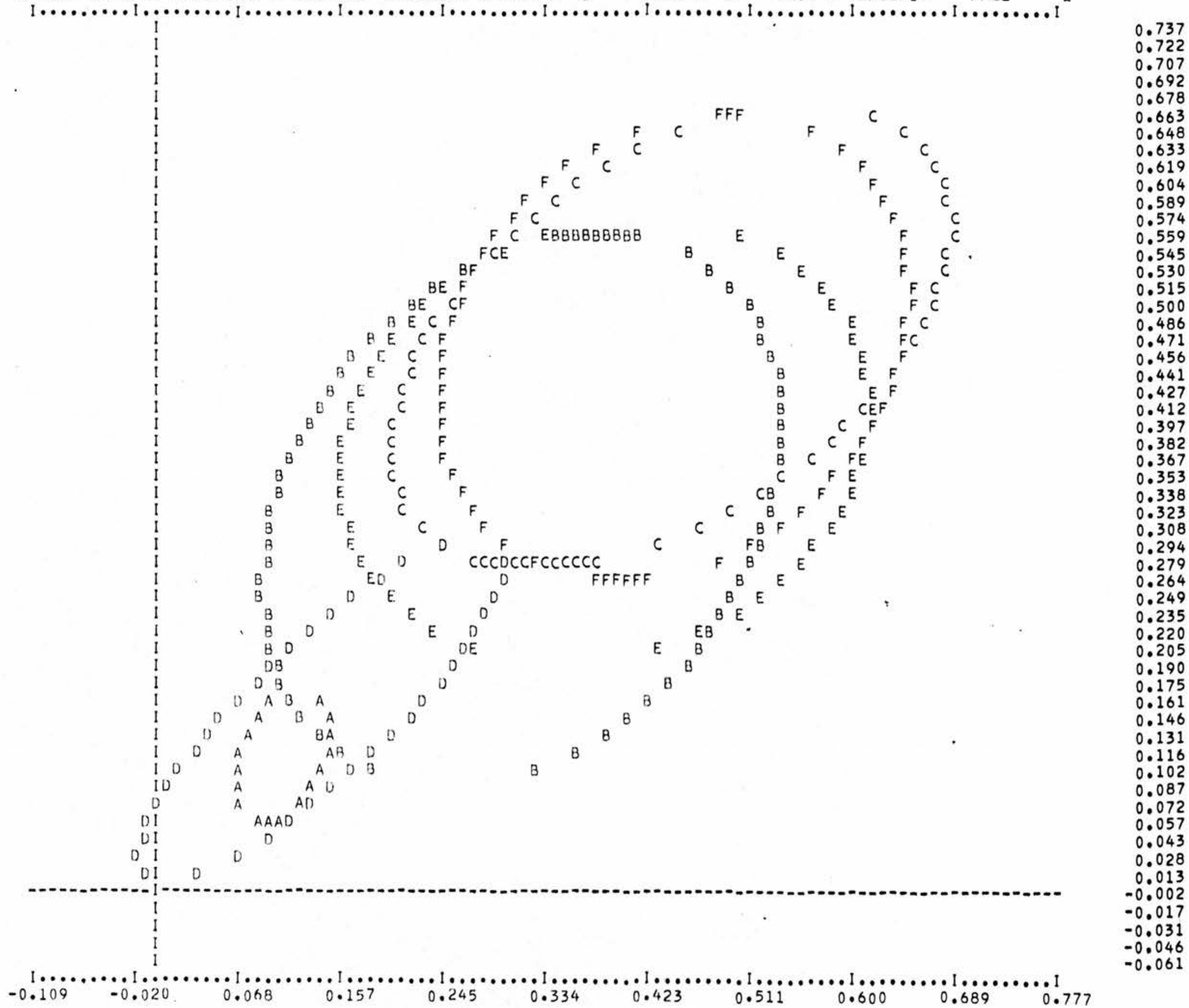
\# KOJI VS KOEI PROBABILITY ELIPSE# 00010000 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 1

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
KOJ1	A		0.109	0.028	0.114	0.042	0.3785	0.250	0.573	0.38	-2.63	0.06	0.04
KOJ2	B		0.314	0.159	0.326	0.168	0.2862	0.271	0.303	0.82	-1.21	0.26	0.19
KOJ3	C		0.443	0.171	0.471	0.141	0.4902	0.597	0.403	1.48	-0.67	0.27	0.15
KOE1	D		0.143	0.113	0.154	0.105	0.8635	0.927	0.804	1.09	-0.92	0.21	0.06
KOE2	E		0.386	0.162	0.383	0.134	0.1593	0.193	0.132	2.77	-0.36	0.24	0.18
KOE3	F		0.446	0.144	0.463	0.142	0.2232	0.227	0.219	1.08	-0.92	0.22	0.18

600

8

* KOJI VS KOEI PROBABILITY ELIPSE* 00010000 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 2



109

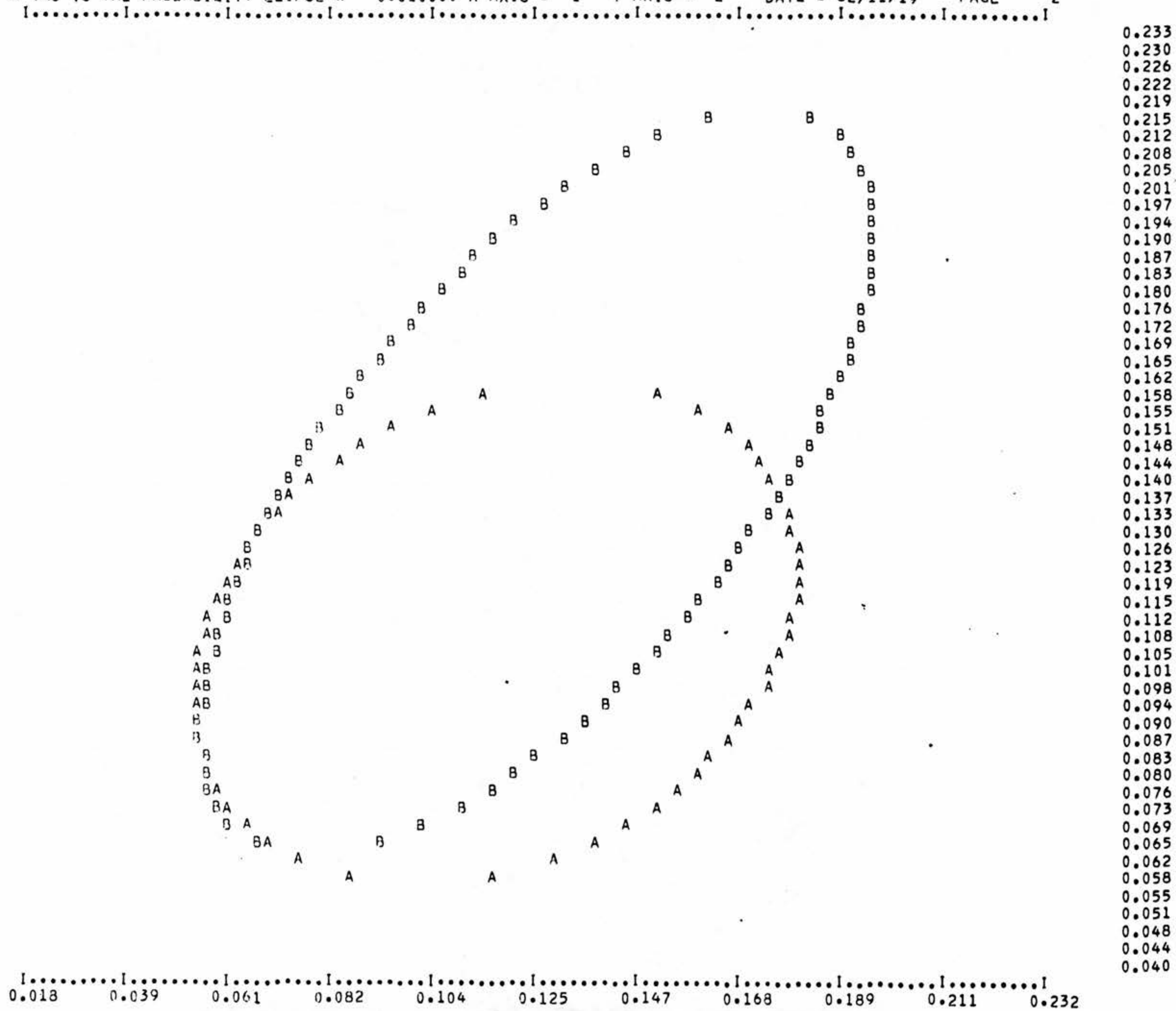
* YAJ VS YAE PROBABILITY ELIPSE * 00010000 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 1

/

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
YAJ1	A		0.117	0.045	0.109	0.037	0.2584	0.313	0.213	2.00	-0.50	0.07	0.05
YAE1	B		0.126	0.050	0.140	0.055	0.6734	0.615	0.737	0.88	-1.14	0.10	0.04

YAJ VS YAE PROBABILITY ELIPSE #   00010000 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE 2

2

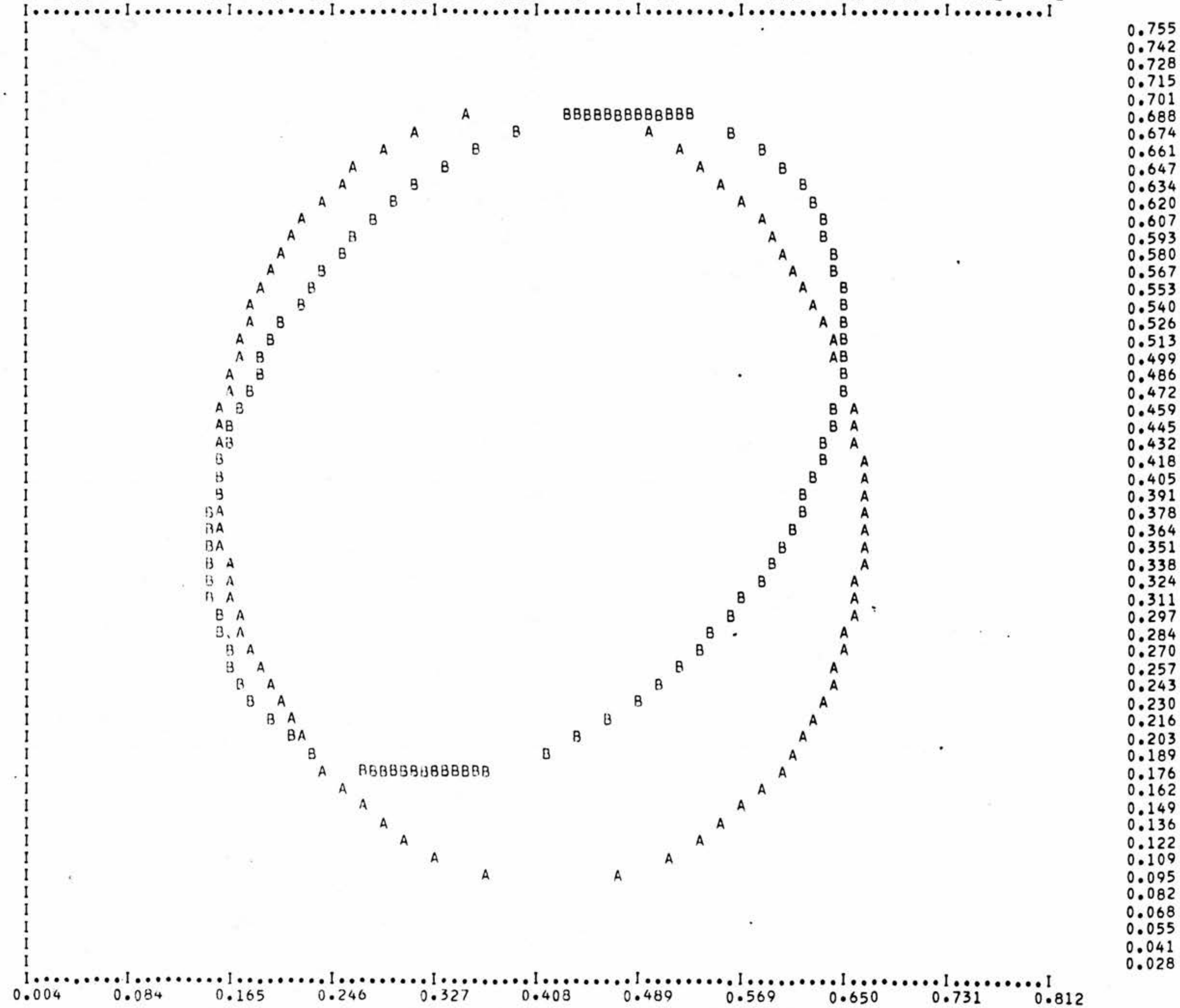


603

* YAJ VS YAE PROBABILITY ELIPSE *   00000010 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE 1

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
YAJ2	A		0.411	0.180	0.391	0.214	-0.0419	-0.035	-0.050	8.46	-0.12	0.25	0.30
YAEZ	B		0.400	0.177	0.431	0.185	0.3314	0.318	0.345	0.88	-1.13	0.30	0.21

2 * YAJ VS YAE PROBABILITY ELIPSE * 00000010 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 2



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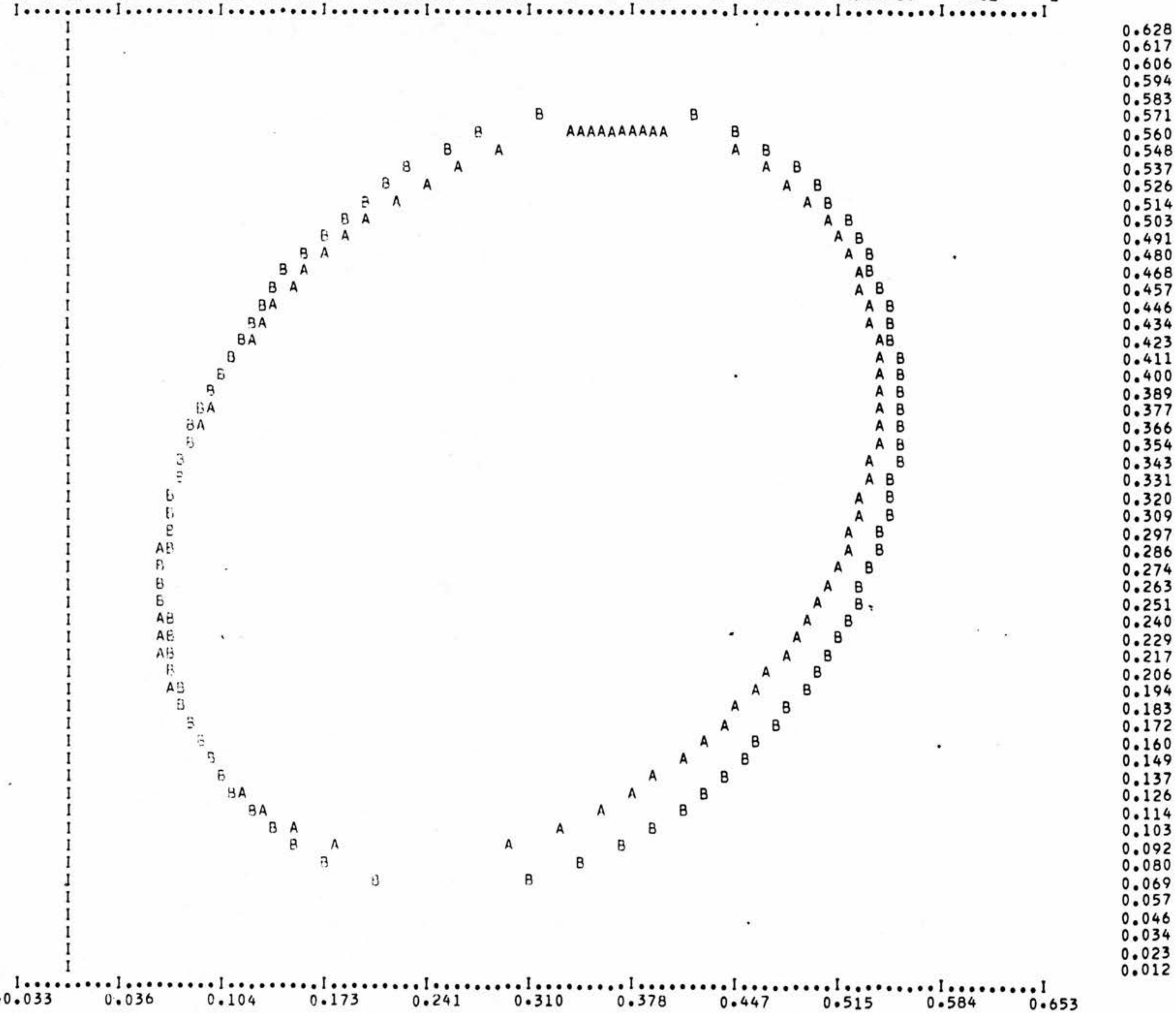
\# YAJ VS YAE PROBABILITY ELIPSE # 00000010 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 1

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
YAJ3	A		0.303	0.170	0.323	0.169	0.2861	0.287	0.285	1.01	-0.99	0.27	0.20
YAE3	B		0.311	0.174	0.320	0.182	0.2281	0.218	0.239	0.82	-1.22	0.28	0.22

3 * YAJ VS YAE PROBABILITY ELIPSE * 00000010 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 2

6



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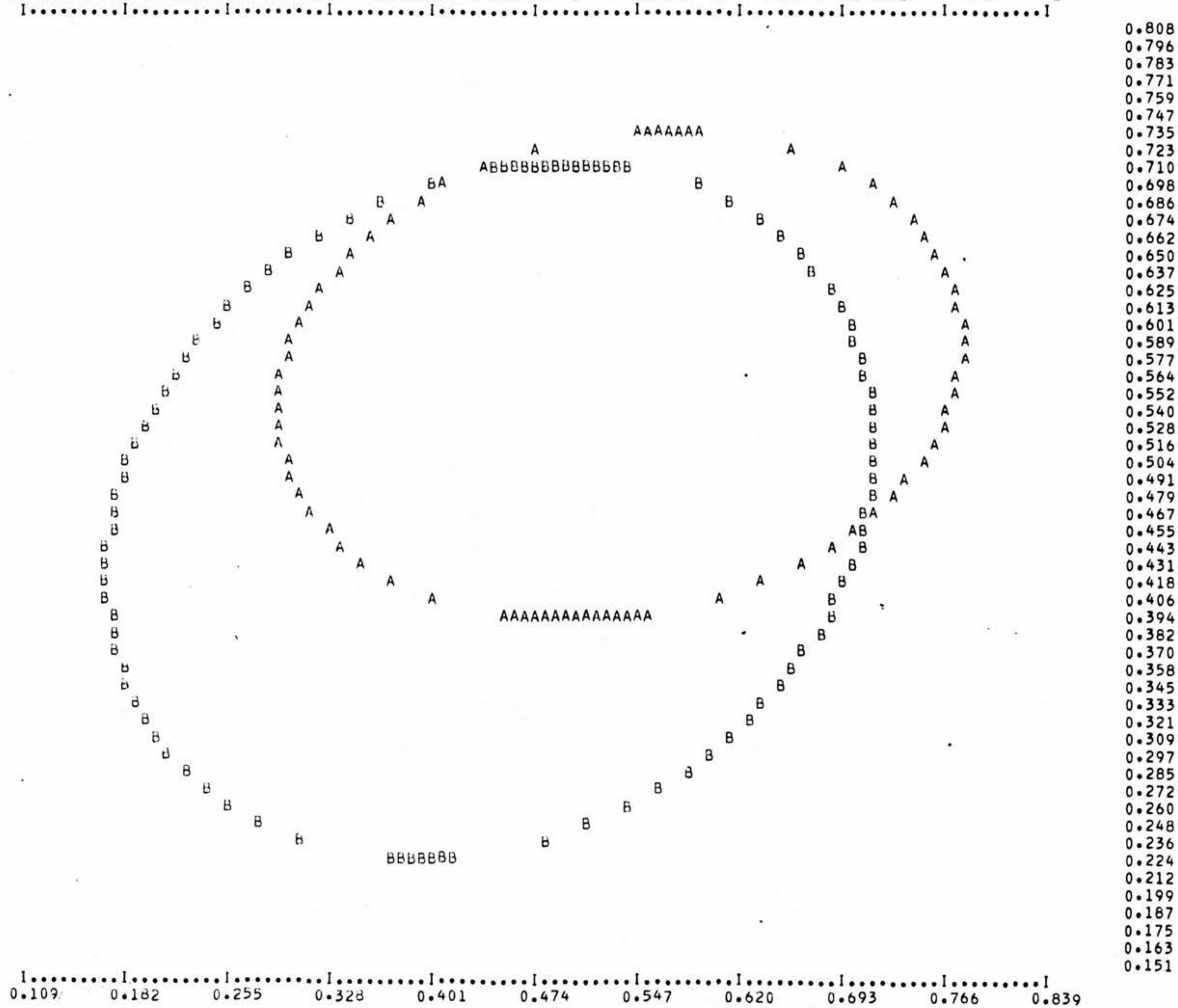
\# YAJ VS YAE PROBABILITY ELIPSE # 00000010 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 1

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
YAJ4	A		0.534	0.172	0.563	0.122	0.1420	0.200	0.101	5.14	-0.19	0.25	0.17
YAE4	B		0.443	0.193	0.469	0.174	0.1935	0.215	0.174	1.69	-0.59	0.29	0.23

8

4 * YAJ VS YAE PROBABILITY ELIPSE * 00000010 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 2



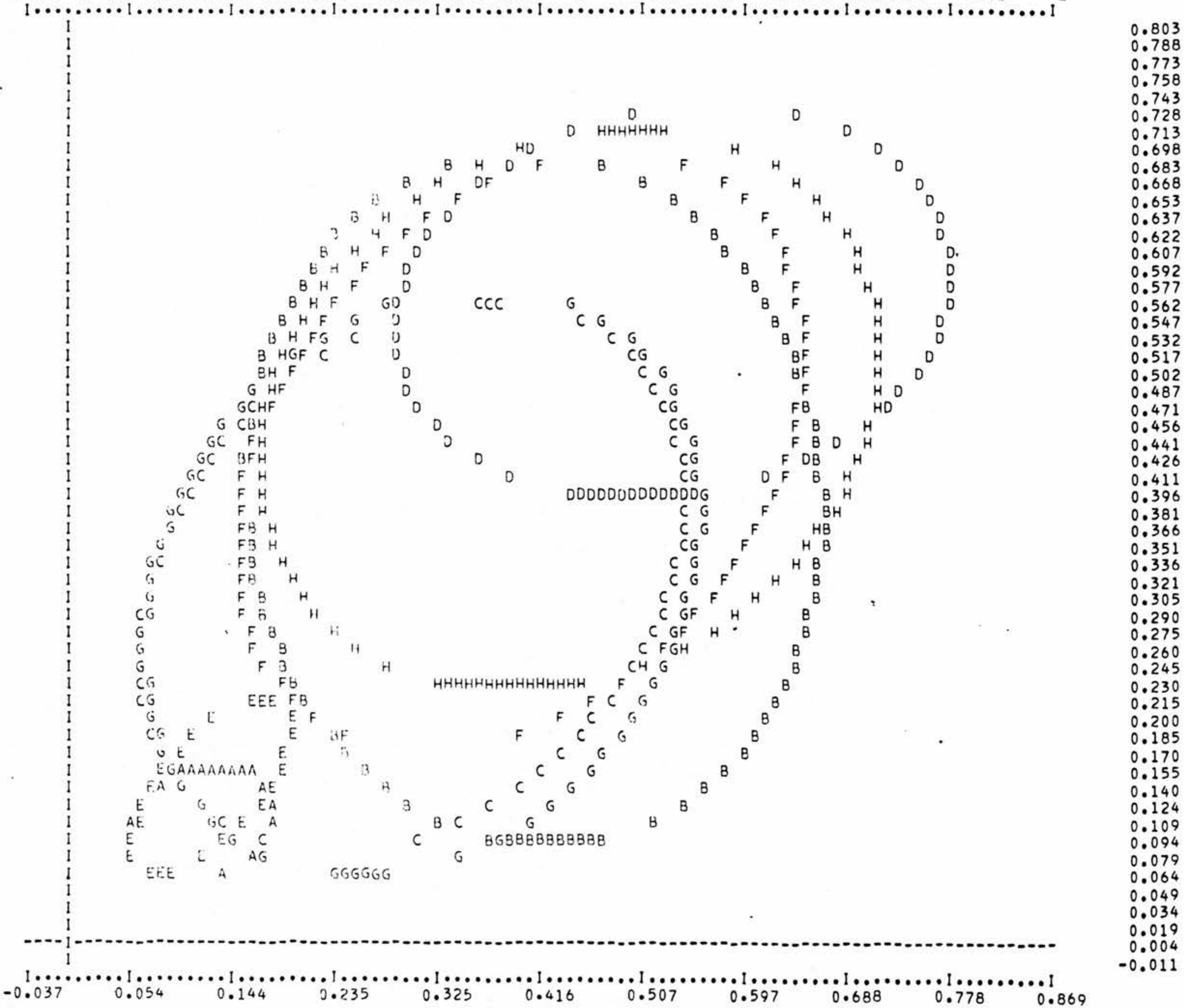
609

9

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
YAJ1	A		0.117	0.045	0.109	0.037	0.2584	0.313	0.213	2.00	-0.50	0.07	0.05
YAJ2	B		0.411	0.180	0.391	0.214	-0.0419	-0.035	-0.050	8.46	-0.12	0.25	0.30
YAJ3	C		0.303	0.170	0.323	0.169	0.2861	0.287	0.285	1.01	-0.99	0.27	0.20
YAJ4	D		0.534	0.172	0.563	0.122	0.1420	0.200	0.101	5.14	-0.19	0.25	0.17
YAE1	E		0.126	0.050	0.140	0.055	0.6734	0.615	0.737	0.88	-1.14	0.10	0.04
YAE2	F		0.400	0.177	0.431	0.185	0.3314	0.318	0.345	0.88	-1.13	0.30	0.21
YAE3	G		0.311	0.174	0.320	0.182	0.2281	0.218	0.239	0.82	-1.22	0.28	0.22
YAE4	H		0.443	0.193	0.469	0.174	0.1935	0.215	0.174	1.69	-0.59	0.29	0.23

* YAJ VS YAE PROBABILITY ELIPSE * 00010000 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 2

10



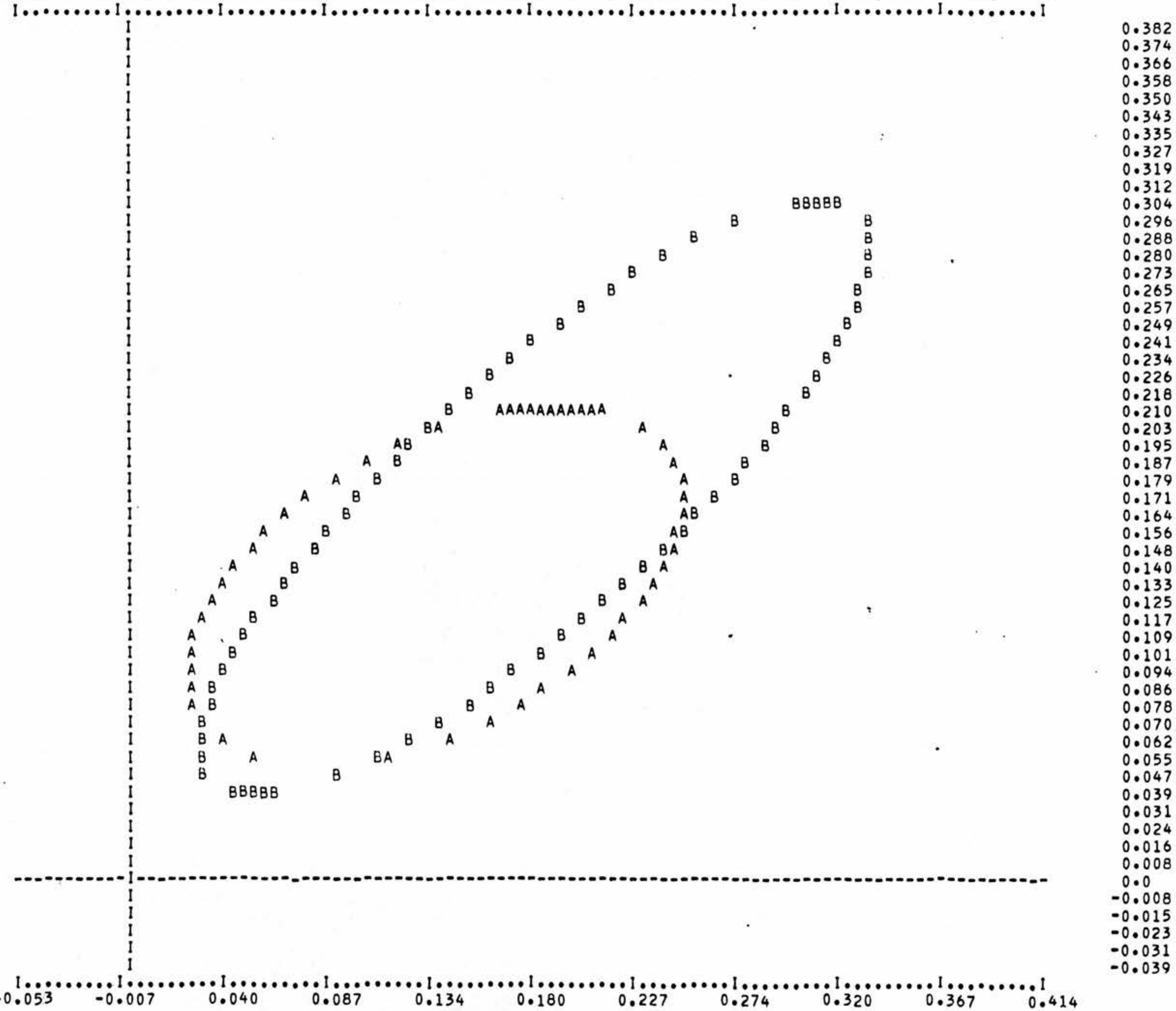
* KUJ VS KUE PROBABILITY ELIPSE * 00010001 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 1

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
KUJ1	A		0.137	0.080	0.131	0.057	0.4947	0.686	0.357	1.88	-0.53	0.12	0.06
KUE1	B		0.183	0.108	0.171	0.094	0.8478	0.972	0.739	1.18	-0.85	0.20	0.06

612

* KUJ VS KUE PROBABILITY ELIPSE *   00010001 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE   2

2



613

* KUJ VS KUE PROBABILITY ELIPSE * 00010001 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 1

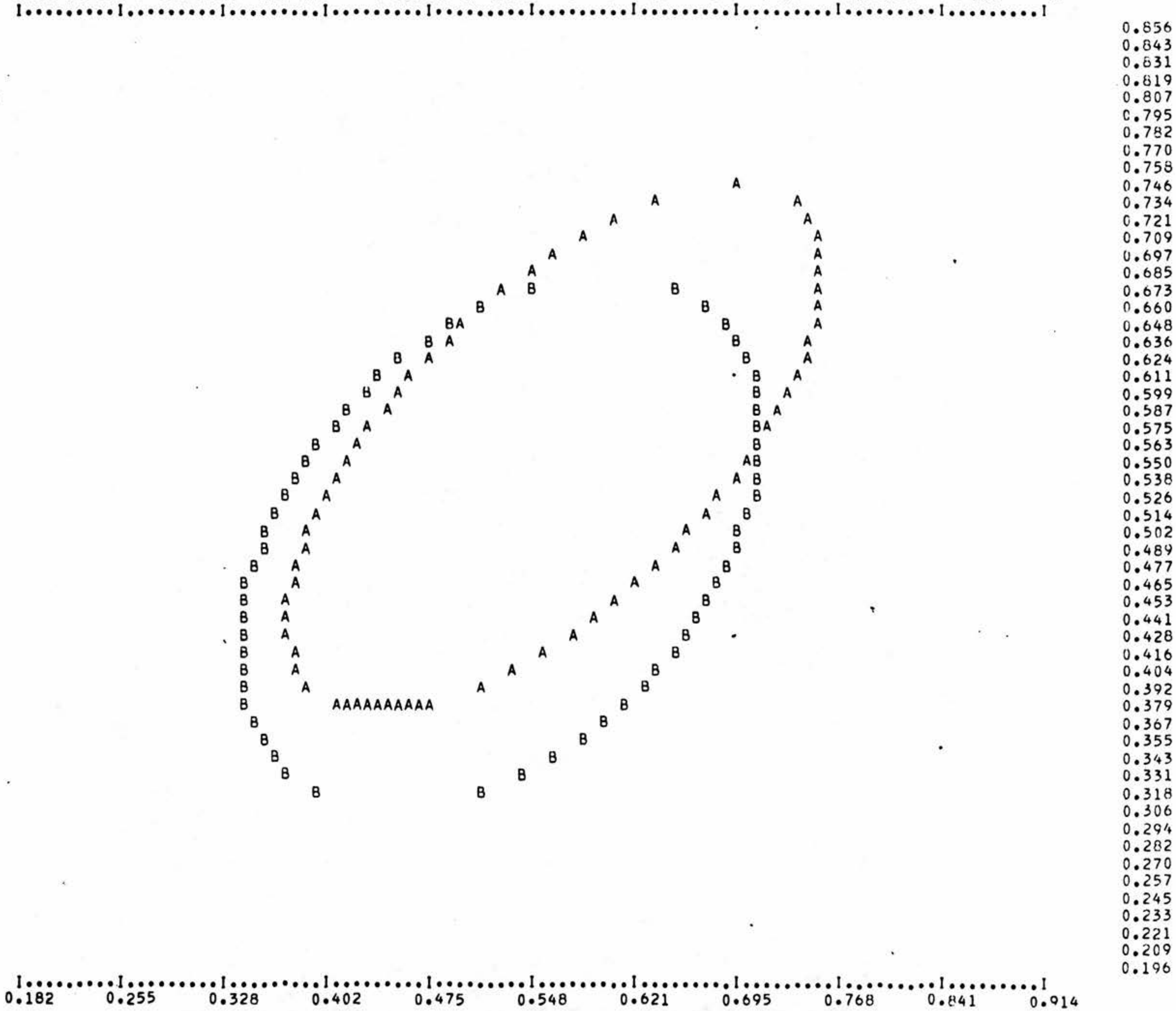
3

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
KUJ2	A		0.566	0.135	0.560	0.131	0.6632	0.682	0.645	1.04	-0.96	0.24	0.11
KUE2	B		0.526	0.132	0.494	0.133	0.4163	0.412	0.420	0.98	-1.02	0.22	0.14

614

4

* KUJ VS KUE PROBABILITY ELIPSE *   00010001 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE 2

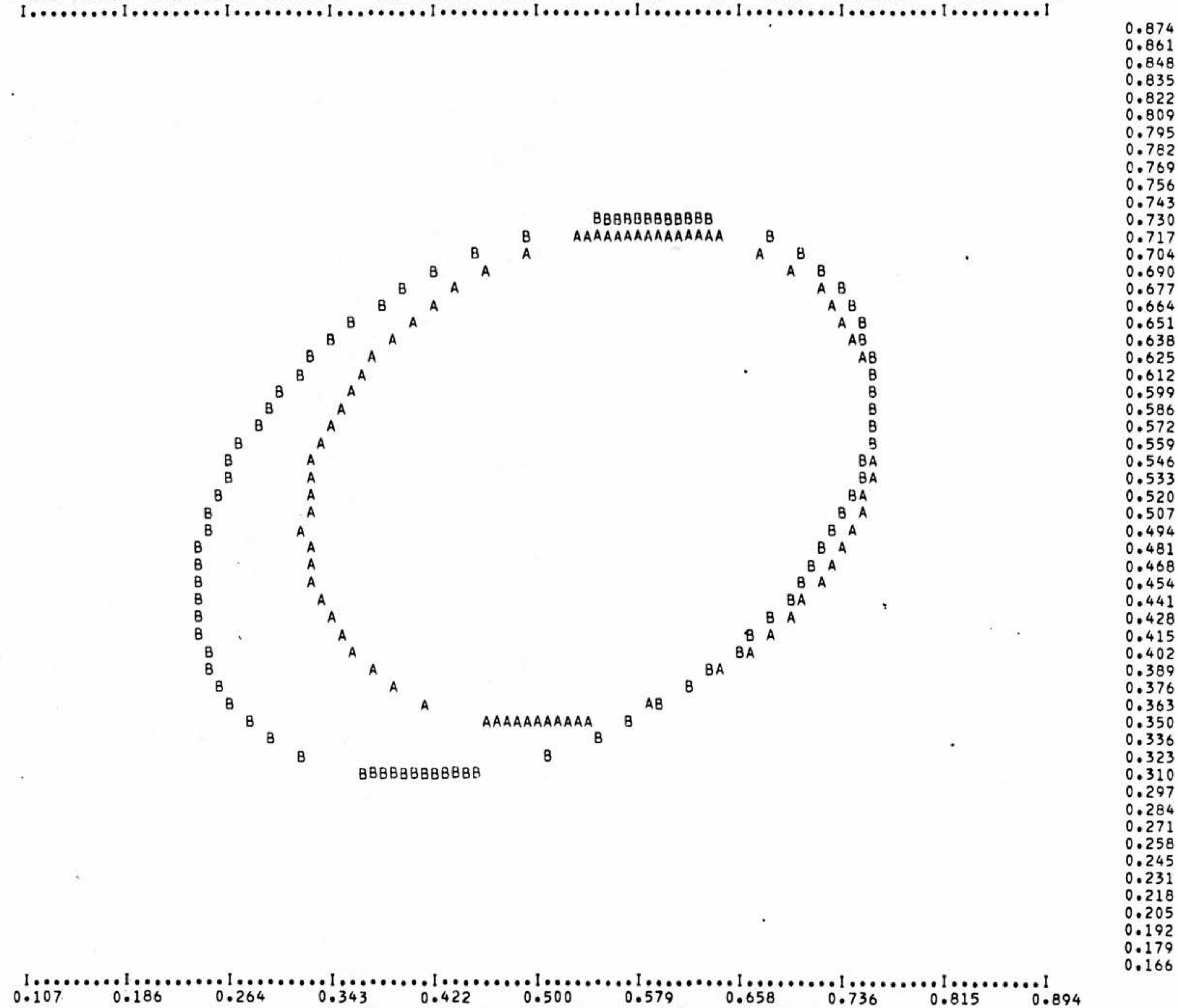


* KUJ VS KUE PROBABILITY ELIPSE * 00010001 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 1

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
KUJ3	A		0.543	0.155	0.534	0.133	0.2054	0.240	0.176	2.02	-0.49	0.23	0.18
KUE3	B		0.500	0.185	0.520	0.151	0.3479	0.427	0.283	1.76	-0.57	0.28	0.19

* KUJ VS KUE PROBABILITY ELIPSE *   00010001 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE   2

6



617

7

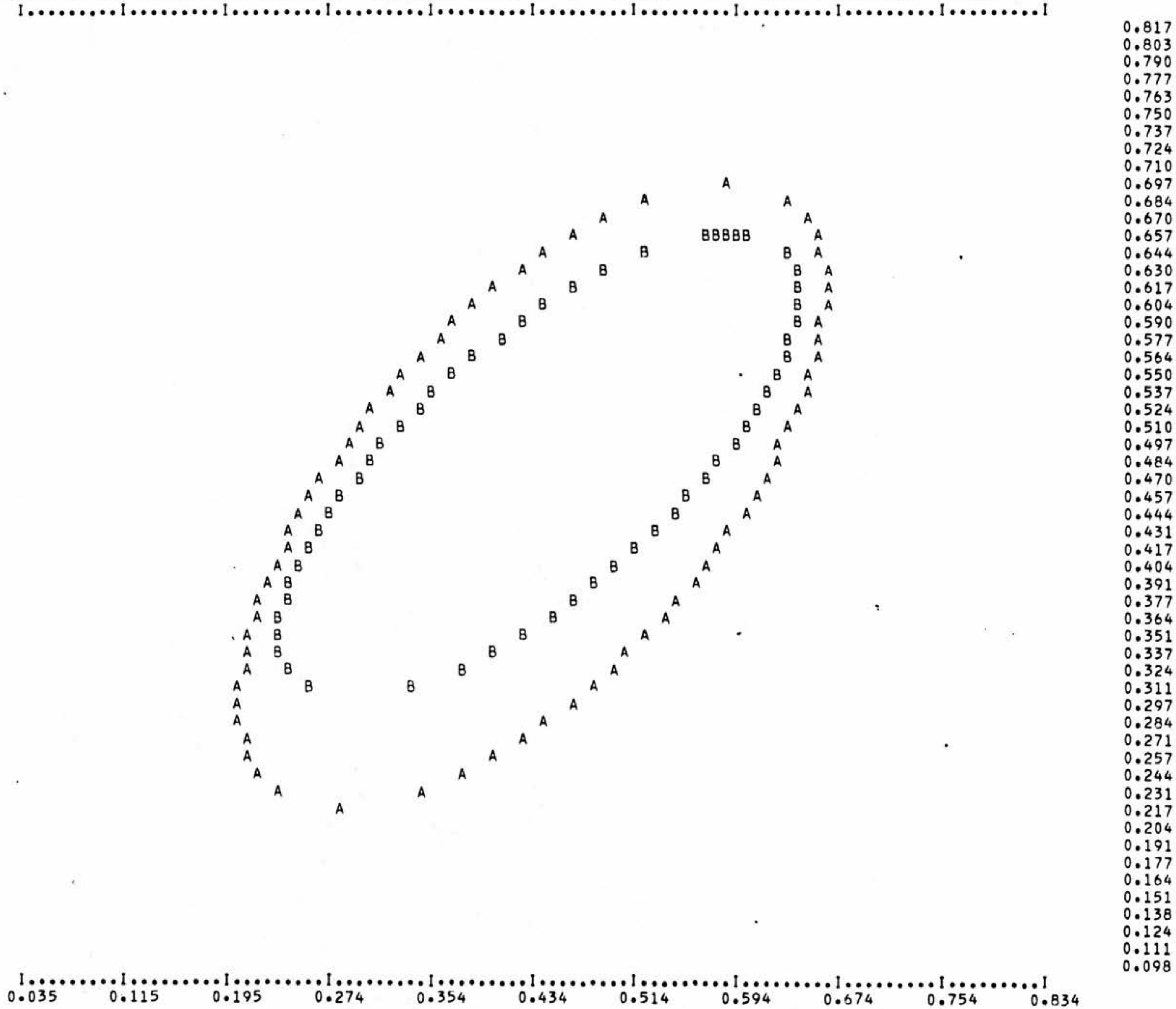
* KUJ VS KUE PROBABILITY ELIPSE *   00010001 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE 1

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
KUJ4	A		0.434	0.162	0.457	0.170	0.6568	0.628	0.687	0.93	-1.07	0.30	0.14
KUE4	B		0.440	0.144	0.480	0.126	0.7376	0.842	0.646	1.20	-0.84	0.25	0.10

618

8

\# KUJ VS KUE PROBABILITY ELIPSE \#   00010001 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE   2



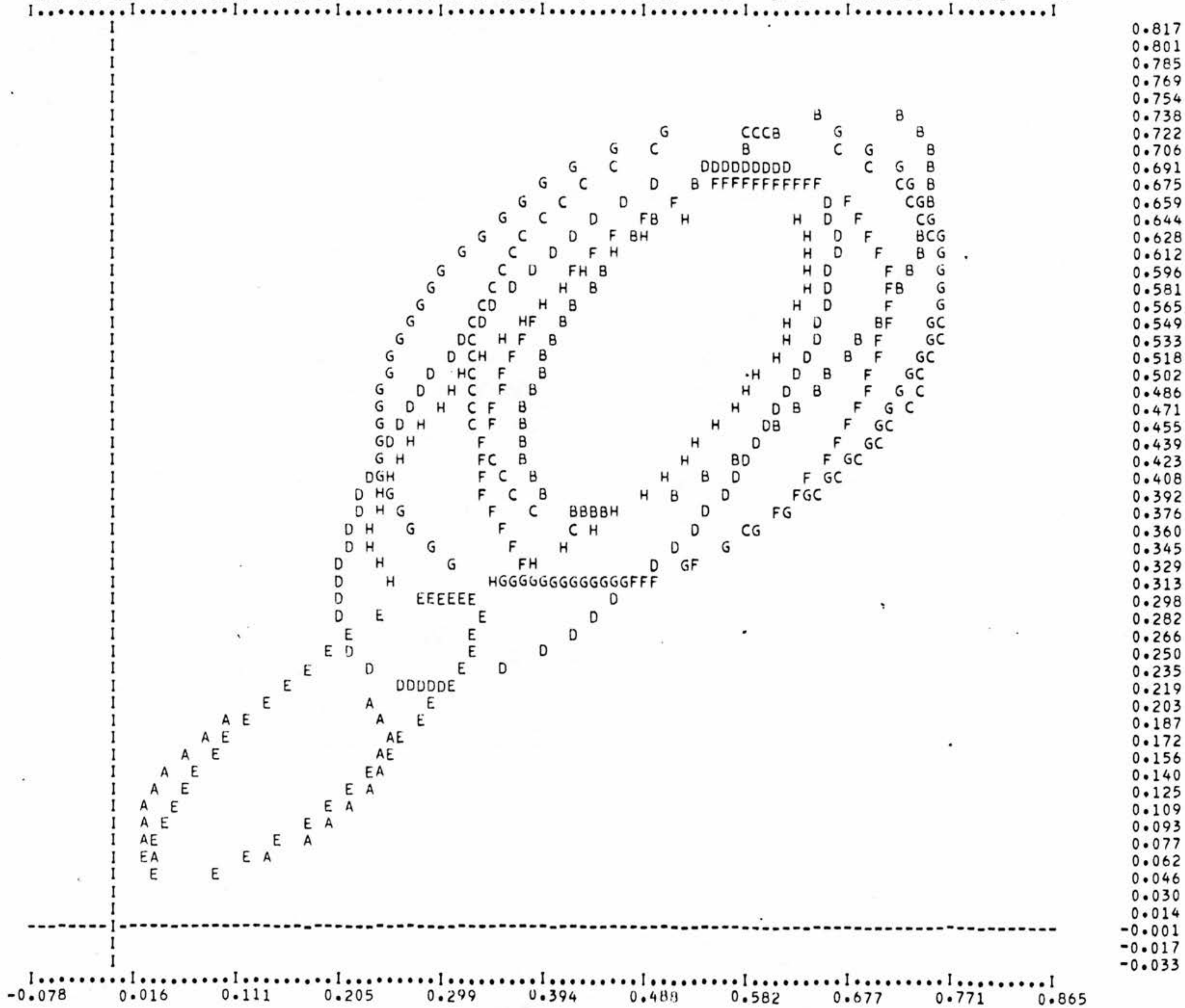
619

9

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
KUJ1	A		0.137	0.080	0.131	0.057	0.4947	0.686	0.357	1.88	-0.53	0.12	0.06
KUJ2	B		0.566	0.135	0.560	0.131	0.6632	0.682	0.645	1.04	-0.96	0.24	0.11
KUJ3	C		0.543	0.155	0.534	0.133	0.2054	0.240	0.176	2.02	-0.49	0.23	0.18
KUJ4	D		0.434	0.162	0.457	0.170	0.6568	0.628	0.687	0.93	-1.07	0.30	0.14
KUE1	E		0.183	0.108	0.171	0.094	0.8478	0.972	0.739	1.18	-0.85	0.20	0.06
KUE2	F		0.526	0.132	0.494	0.133	0.4163	0.412	0.420	0.98	-1.02	0.22	0.14
KUE3	G		0.500	0.185	0.520	0.151	0.3479	0.427	0.283	1.76	-0.57	0.28	0.19
KUE4	H		0.440	0.144	0.480	0.126	0.7376	0.842	0.646	1.20	-0.84	0.25	0.10

620

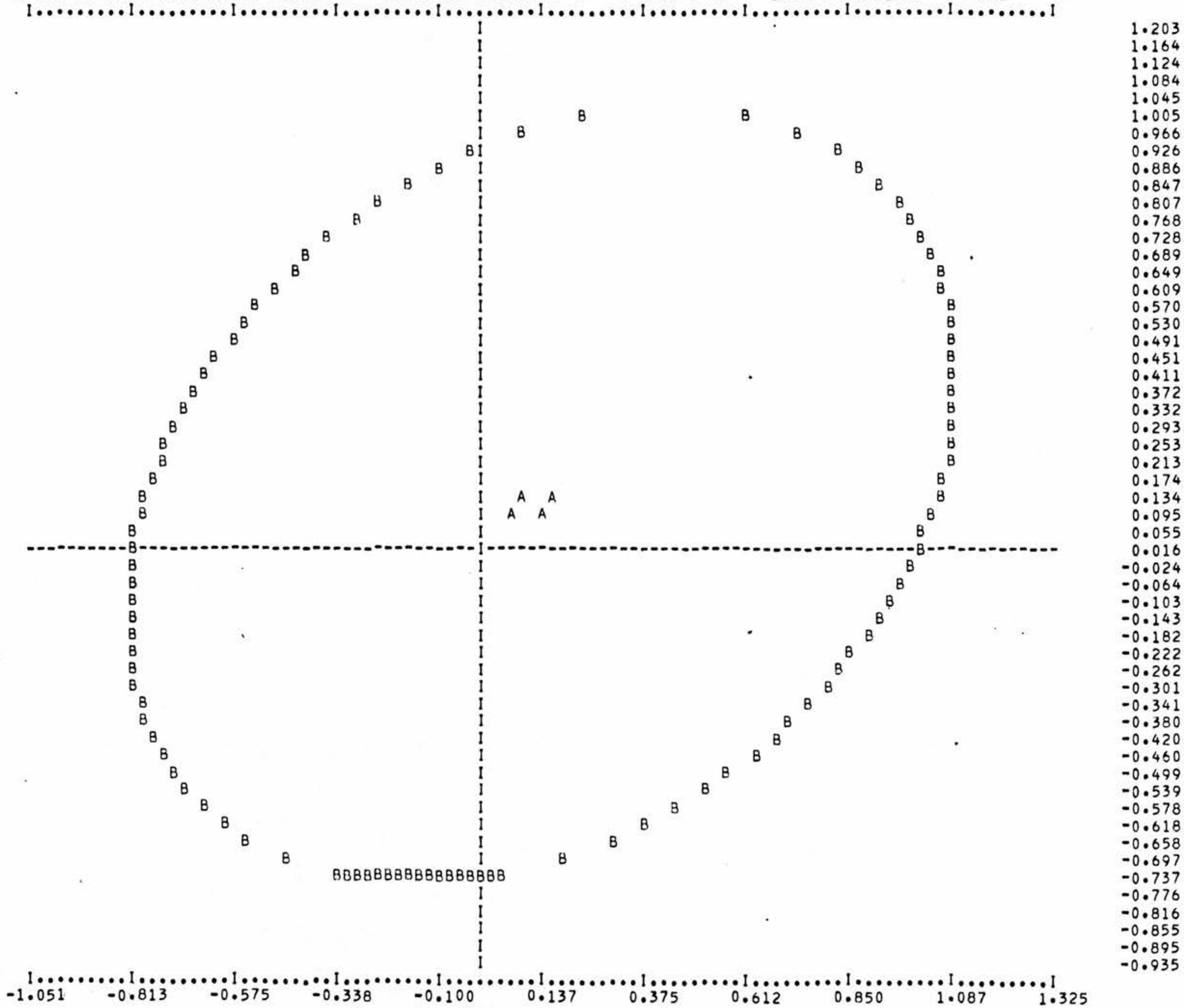
* KUJ VS KUE PROBABILITY ELIPSE *   00010000 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE 2



* ORJ VS ORE PROBABILITY ELIPSE *   00010002 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE 1

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
ORJ1	A		0.114	0.035	0.111	0.040	0.7035	0.619	0.800	0.83	-1.20	0.07	0.03
ORE1	B		0.137	0.680	0.134	0.630	0.3032	0.327	0.281	1.28	-0.78	1.06	0.77

ORJ VS ORE PROBABILITY ELIPSE #   00010002 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE 2



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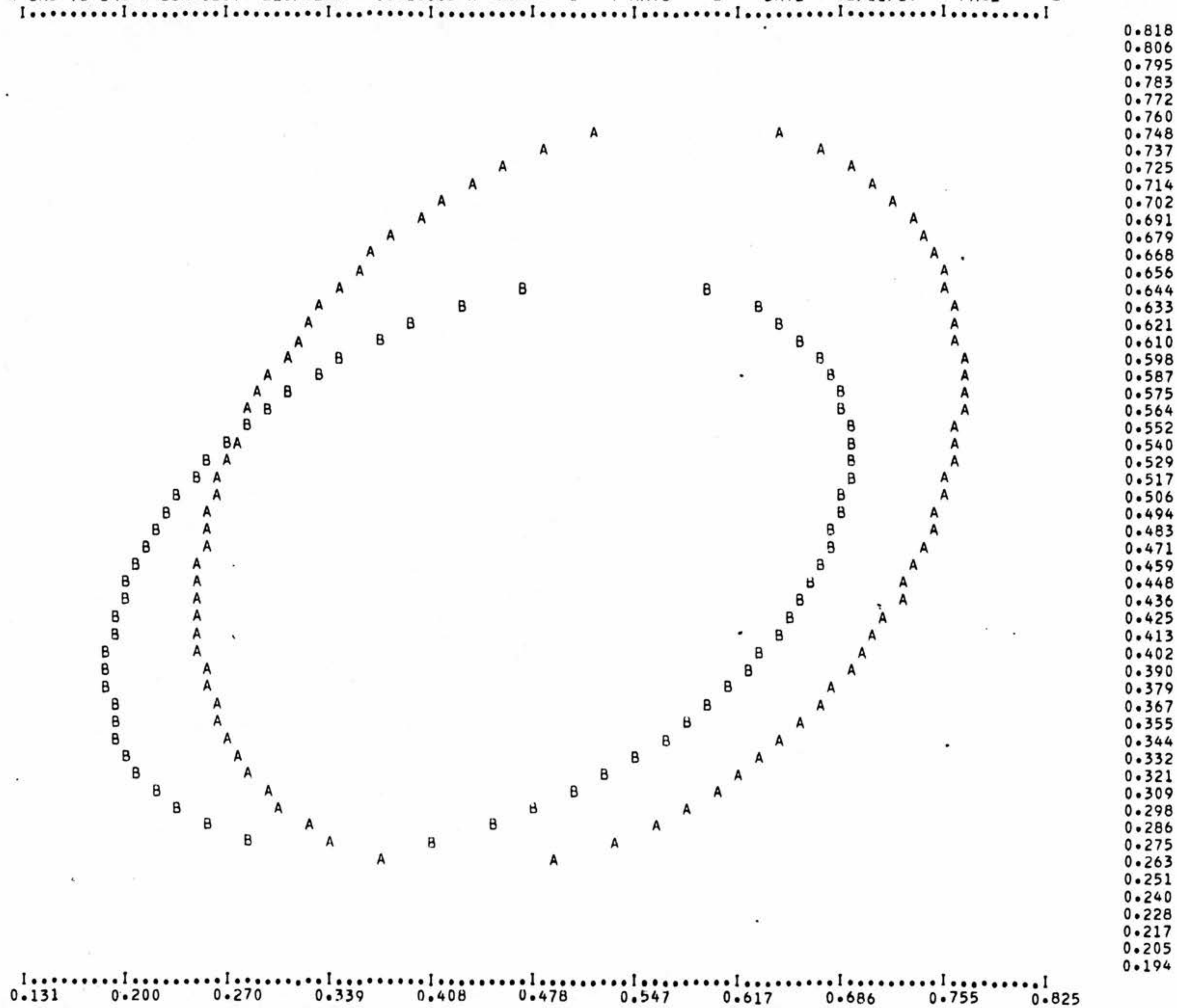
* ORJ VS ORE PROBABILITY ELIPSE *   00010002 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE 1

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
ORJ2	A		0.509	0.183	0.506	0.177	0.2987	0.308	0.290	1.11	-0.90	0.29	0.21
ORE2	B		0.440	0.178	0.460	0.136	0.3866	0.506	0.295	1.93	-0.52	0.27	0.16

624

ORJ VS ORE PROBABILITY ELIPSE #   00010002 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE   2



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* ORJ VS ORE PROBABILITY ELIPSE *   00010002 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE 1

5

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CURRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
ORJ3	A		0.543	0.161	0.554	0.140	0.5180	0.595	0.451	1.30	-0.77	0.26	0.15
ORE3	B		0.503	0.163	0.520	0.145	0.5658	0.636	0.503	1.23	-0.81	0.27	0.14

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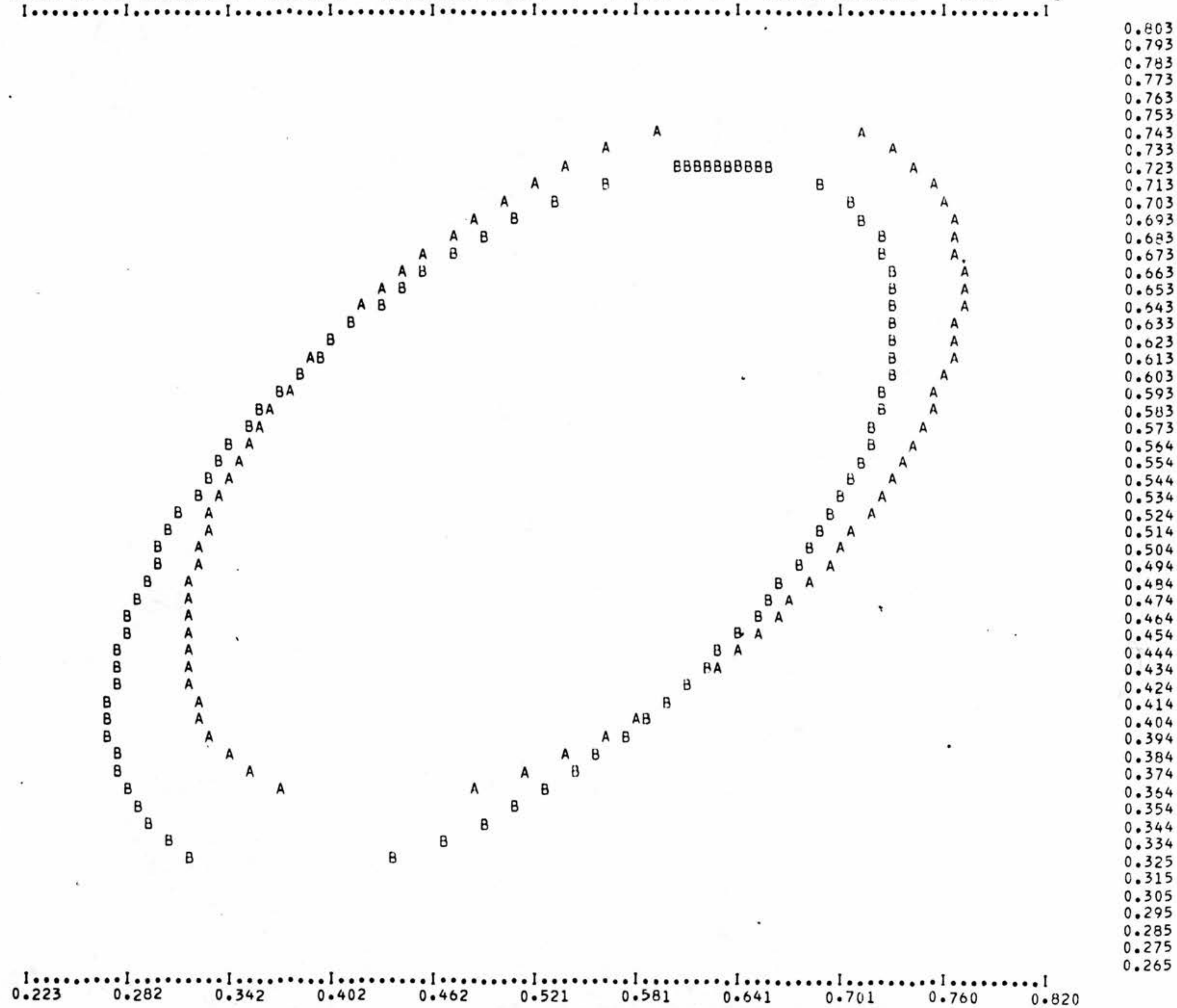
* ORJ VS ORE PROBABILITY ELIPSE *   00010002 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE   2



627

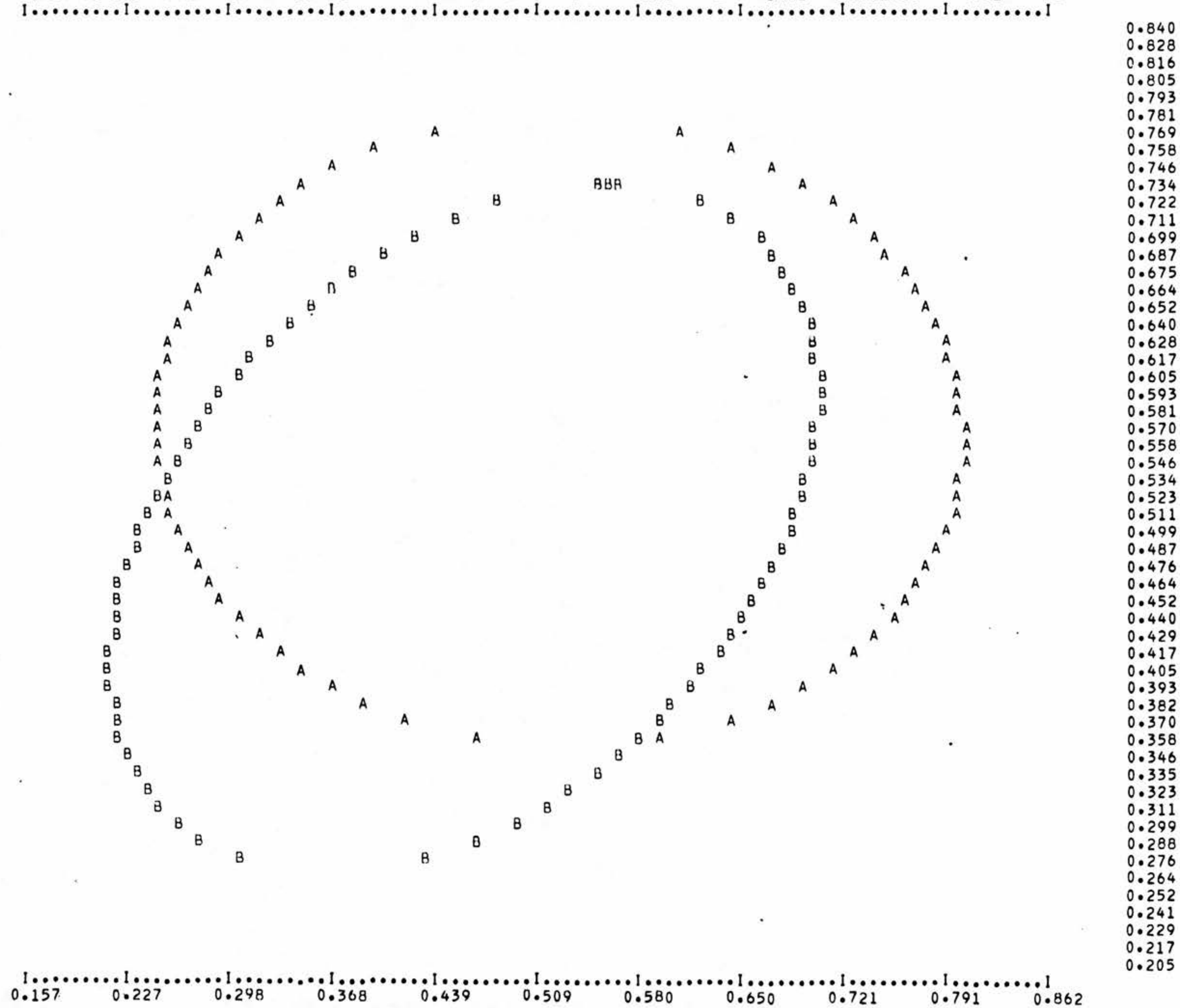
7

* ORJ4 VS ORE4 PROBABILITY ELIPSE *   X AXIS = 1   Y AXIS = 2   DATE = 82/11/20   PAGE 1

TITLE	SYM.	SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
ORJ4	A		0.526	0.196	0.566	0.151	-0.0201	-0.026	-0.015	0.04	-26.31	0.21	0.28
ORE4	B		0.460	0.173	0.500	0.166	0.3996	0.417	0.383	1.11	-0.90	0.28	0.19

628

8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69

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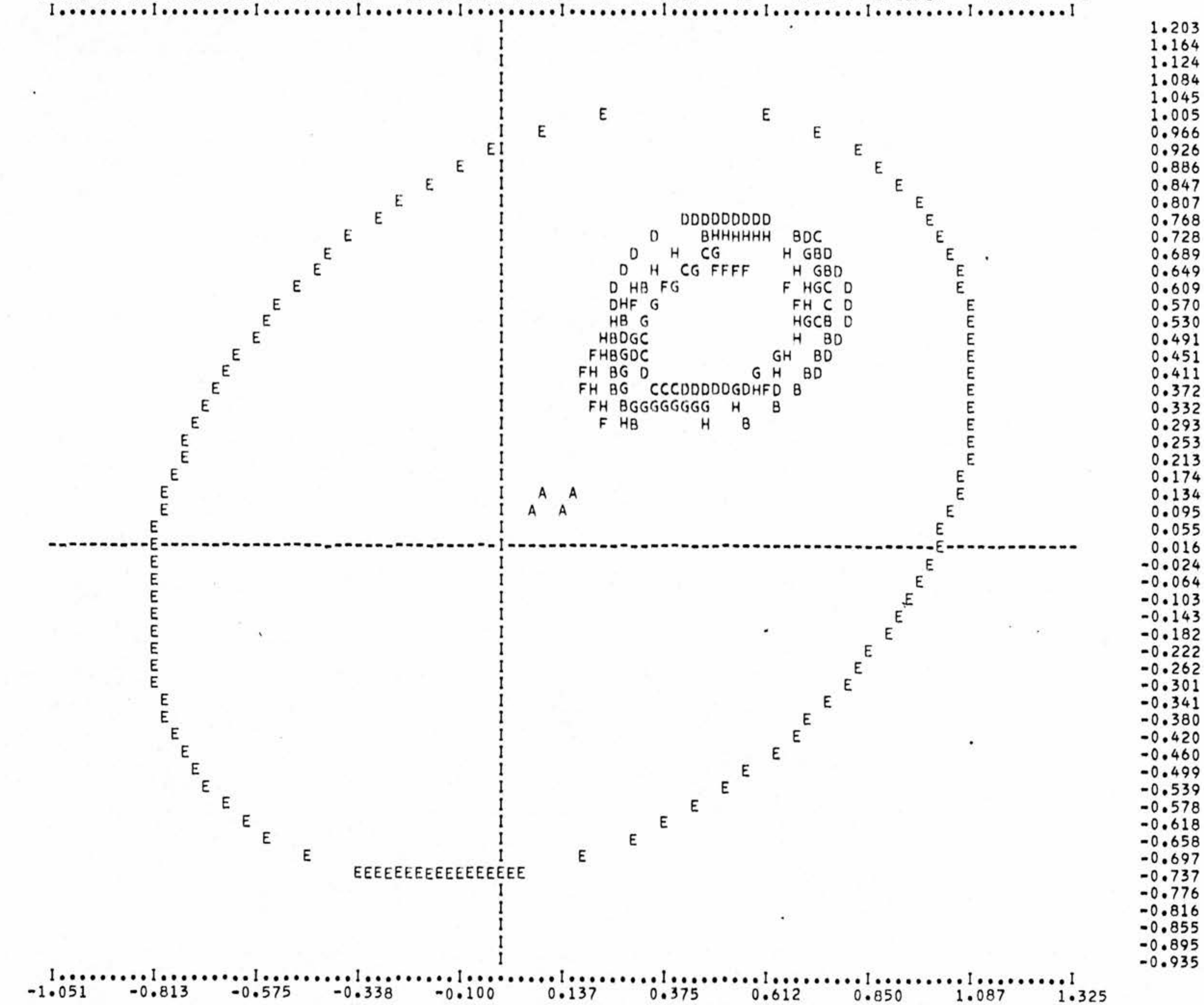
* ORJ VS ORE PROBABILITY ELIPSE * 00010000 X AXIS = 1 Y AXIS = 2 DATE = 82/11/19 PAGE 1

TITLE	SYM. SAMPLE	X-MEAN	X-STD.	Y-MEAN	Y-STD.	CORRE.	X-REG.	Y-REG.	GRADIENT		RADIUS	
ORJ1	A	0.114	0.035	0.111	0.040	0.7035	0.619	0.800	0.83	-1.20	0.07	0.03
ORJ2	B	0.509	0.183	0.506	0.177	0.2987	0.308	0.290	1.11	-0.90	0.29	0.21
ORJ3	C	0.543	0.161	0.554	0.140	0.5180	0.595	0.451	1.30	-0.77	0.26	0.15
ORJ4	D	0.526	0.196	0.566	0.151	-0.0201	-0.026	-0.015	0.04	-26.31	0.21	0.28
ORE1	E	0.137	0.680	0.134	0.630	0.3032	0.327	0.281	1.28	-0.78	1.06	0.77
ORE2	F	0.440	0.178	0.460	0.136	0.3866	0.506	0.295	1.93	-0.52	0.27	0.16
ORE3	G	0.503	0.163	0.520	0.145	0.5658	0.636	0.503	1.23	-0.81	0.27	0.14
ORE4	H	0.460	0.173	0.500	0.166	0.3996	0.417	0.383	1.11	-0.90	0.28	0.19

* ORJ VS ORE PROBABILITY ELIPSE *   00010000 X AXIS = 1   Y AXIS = 2   DATE = 82/11/19   PAGE 2



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     5.     PARAMETERS      DATA(1), MINKOWSKI(1.0)
     6.     DIMENSION       2 TO 5
     7.     INPUT FORMAT    (10F5.0)
     8.     READ MATRIX

ROW  2  0.2400E+02

ROW  3  0.1800E+02  0.2500E+02

ROW  4  0.2200E+02  0.1500E+02  0.9000E+01

ROW  5  0.5000E+02  0.6000E+01  0.2600E+02  0.2300E+02

ROW  6  0.5400E+02  0.2000E+02  0.1900E+02  0.2100E+02  0.1000E+02

ROW  7  0.1000E+01  0.4700E+02  0.7200E+02  0.2750E+02  0.3000E+02  0.5500E+02

ROW  8  0.4000E+02  0.3200E+02  0.5000E+01  0.1300E+02  0.3200E+02  0.1700E+02
        0.4300E+02

ROW  9  0.1400E+02  0.7000E+01  0.3400E+02  0.2750E+02  0.3800E+02  0.4100E+02
        0.1150E+02  0.4600E+02

ROW 10  0.3000E+01  0.5100E+02  0.4900E+02  0.2900E+02  0.5200E+02  0.5300E+02
        0.4000E+01  0.4400E+02  0.1150E+02

ROW 11  0.3550E+02  0.2000E+01  0.4800E+02  0.4500E+02  0.1600E+02  0.3700E+02
        0.3900E+02  0.4200E+02  0.8000E+01  0.3550E+02

  10 ROWS ARE READ
```

2

SOLUTION IN 3 DIMENSIONS:

* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

```
RAW STRESS DHAT     =    0.259638
STRESS DHAT         =    0.046323
RAW STRESS DSTAR    =    0.648471
COEF. ALIEN. DSTAR  =    0.073158
```

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.138224

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 4
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 15

633

F I N A L C O N F I G U R A T I O N

1	-0.8781	0.2760	0.1975
2	0.3208	-0.7008	0.0338
3	0.3421	0.8076	-0.1532
4	0.3106	0.5983	0.4858
5	0.6509	-0.4319	0.6627
6	1.2988	0.0245	-0.1024
7	-1.0233	0.0928	0.2827
8	0.4301	0.7753	-0.5685
9	-0.4224	-0.6199	-0.3698
10	-1.1396	0.1243	-0.1560
11	0.1102	-0.9462	-0.3125
OMEAN	0.0000	0.0000	0.0000
OSIGMA	0.7336	0.5776	0.3582

KOC3 KOWARERU

DISTANCES

7	1	0.2488	11	2	0.4739	10	1	0.4651	10	7	0.4549	8	3	0.4258
5	2	0.7594	9	2	0.8496	11	9	0.6272	4	3	0.6732	6	5	1.1016
10	9	1.0555	9	7	1.1379	8	4	1.0757	9	1	1.1542	4	2	1.3755
11	5	1.2279	8	6	1.2393	3	1	1.3764	6	3	1.2375	6	2	1.2252
6	4	1.2853	4	1	1.2649	5	4	1.0993	2	1	1.5551	3	2	1.5201
5	3	1.5158	7	4	1.4408	9	4	1.6593	10	4	1.6551	7	5	1.7951
8	2	1.5980	7	3	1.6016	8	5	1.7384	9	3	1.6338	11	1	1.6525
11	10	1.6530	11	6	1.5490	9	5	1.5011	11	7	1.6488	8	1	1.5961
9	6	1.8573	11	8	1.7696	8	7	1.8173	10	8	1.7487	11	4	1.7501
9	8	1.6471	7	2	1.5806	11	3	1.7763	10	3	1.6316	5	1	1.7479
10	2	1.6881	10	5	2.0459	10	6	2.4411	6	1	2.2118	7	6	2.3548

634

KOC3 KOWARERU

3

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.2488	11	2	0.4549	10	1	0.4549	10	7	0.4549	8	3	0.4549
5	2	0.7273	9	2	0.7273	11	9	0.7273	4	3	0.7273	6	5	1.0785
10	9	1.0785	9	7	1.1068	8	4	1.1068	9	1	1.1542	4	2	1.2590
11	5	1.2590	8	6	1.2590	3	1	1.2590	6	3	1.2590	6	2	1.2590
6	4	1.2590	4	1	1.2590	5	4	1.2590	2	1	1.5079	3	2	1.5079
5	3	1.5079	7	4	1.5079	9	4	1.6371	10	4	1.6371	7	5	1.6371
8	2	1.6371	7	3	1.6371	8	5	1.6371	9	3	1.6371	11	1	1.6371
11	10	1.6371	11	6	1.6371	9	5	1.6371	11	7	1.6371	8	1	1.6371
9	6	1.7286	11	8	1.7286	8	7	1.7286	10	8	1.7286	11	4	1.7286
9	8	1.7286	7	2	1.7286	11	3	1.7286	10	3	1.7286	5	1	1.7286
10	2	1.7286	10	5	2.0458	10	6	2.3265	6	1	2.3265	7	6	2.3548

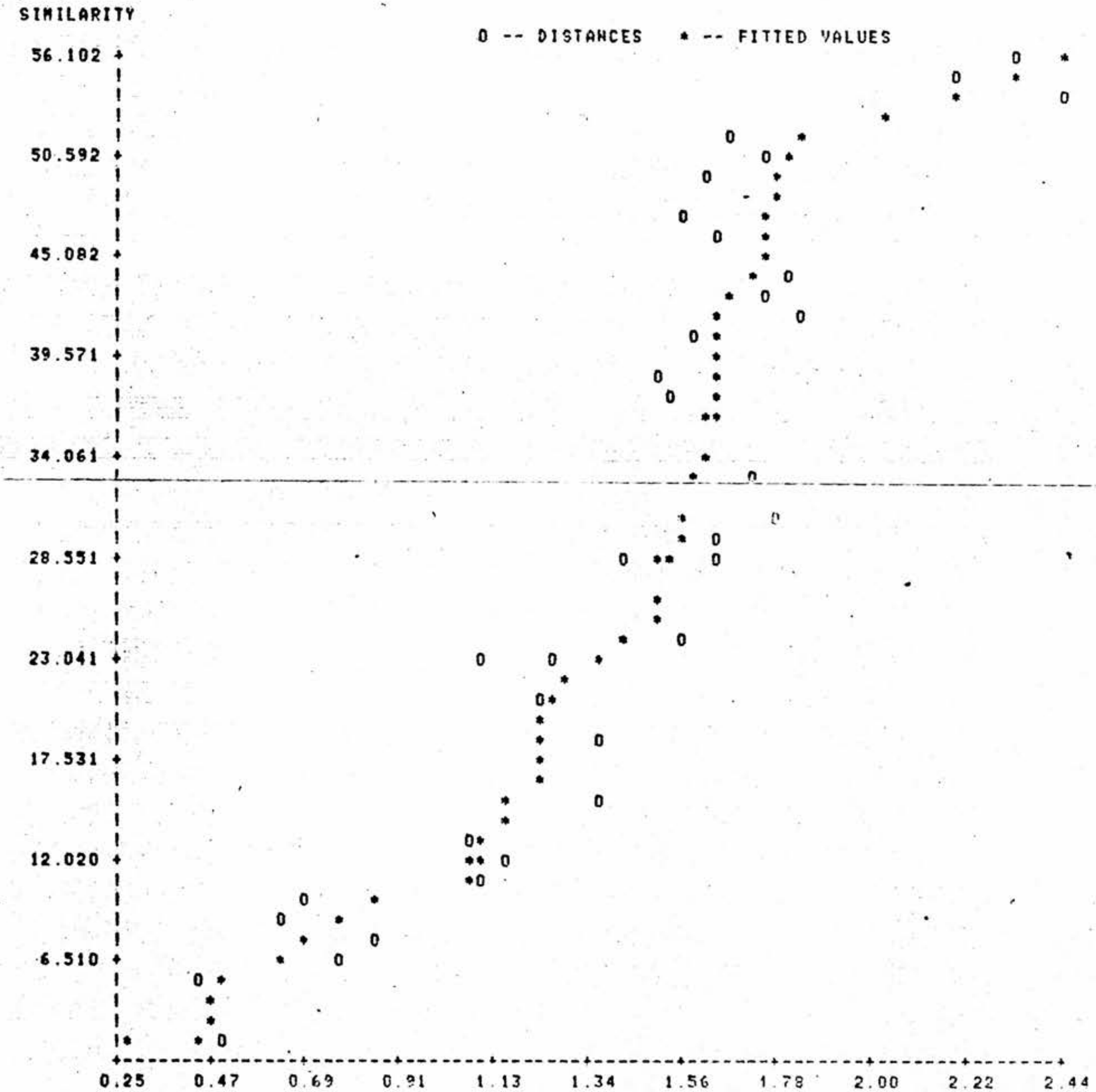
PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.2488	11	2	0.4258	10	1	0.4549	10	7	0.4651	8	3	0.4739
5	2	0.6272	9	2	0.6732	11	9	0.7594	4	3	0.8496	6	5	1.0555
10	9	1.0757	9	7	1.0993	8	4	1.1016	9	1	1.1379	4	2	1.1542
11	5	1.2252	8	6	1.2279	3	1	1.2375	6	3	1.2393	6	2	1.2649
6	4	1.2853	4	1	1.3755	5	4	1.3764	2	1	1.4408	3	2	1.5011
5	3	1.5158	7	4	1.5201	9	4	1.5490	10	4	1.5551	7	5	1.5806
8	2	1.5961	7	3	1.5980	8	5	1.6016	9	3	1.6316	11	1	1.6338
11	10	1.6471	11	6	1.6488	9	5	1.6525	11	7	1.6530	8	1	1.6551
9	6	1.6593	11	8	1.6881	8	7	1.7384	10	8	1.7479	11	4	1.7487
9	8	1.7501	7	2	1.7696	11	3	1.7763	10	3	1.7951	5	1	1.8173
10	2	1.8573	10	5	2.0458	10	6	2.2119	6	1	2.3548	7	6	2.4411

4

KOC3

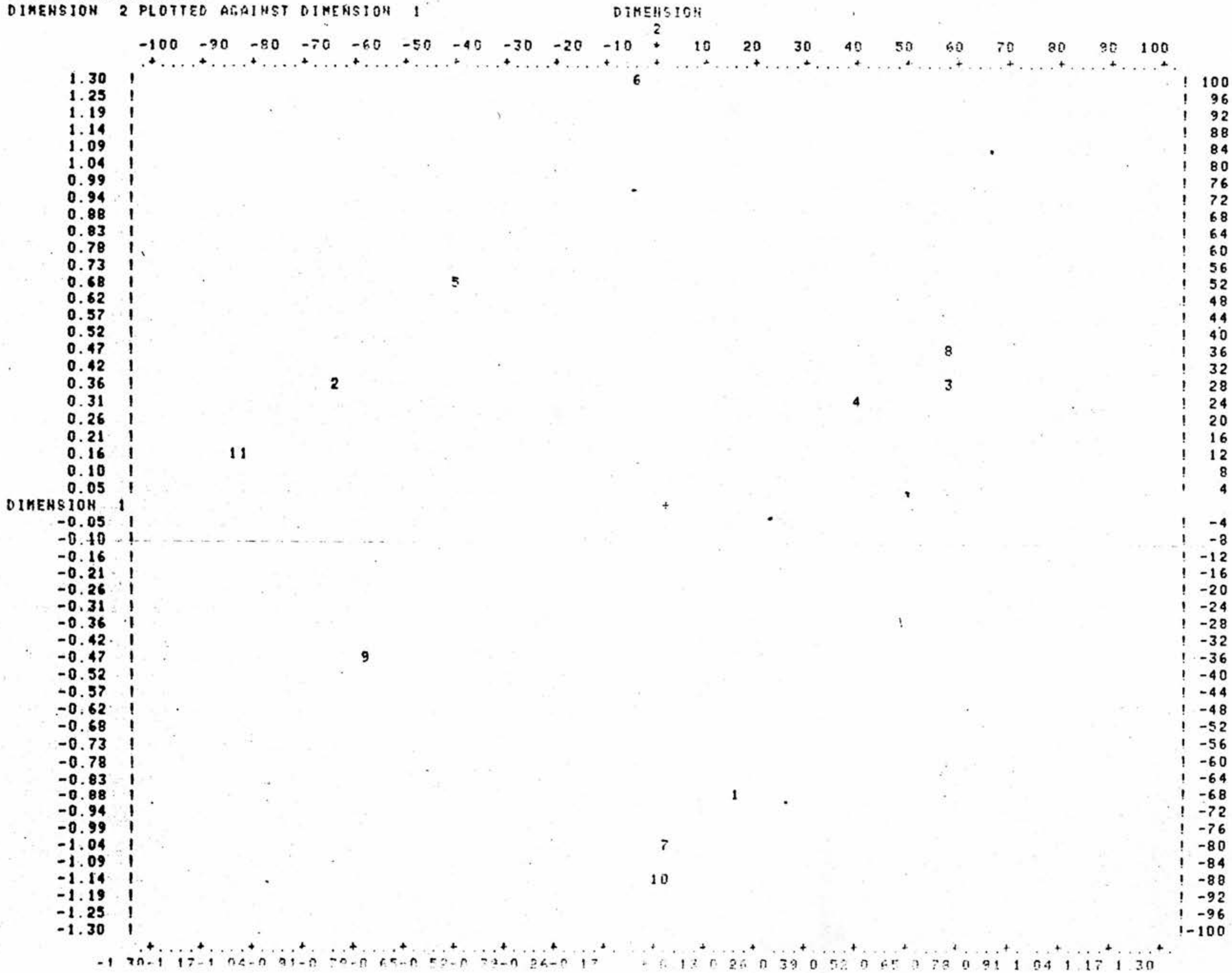
KOWARERU



635

5

FINAL CONFIGURATION
DIMENSION 2 PLOTTED AGAINST DIMENSION 1

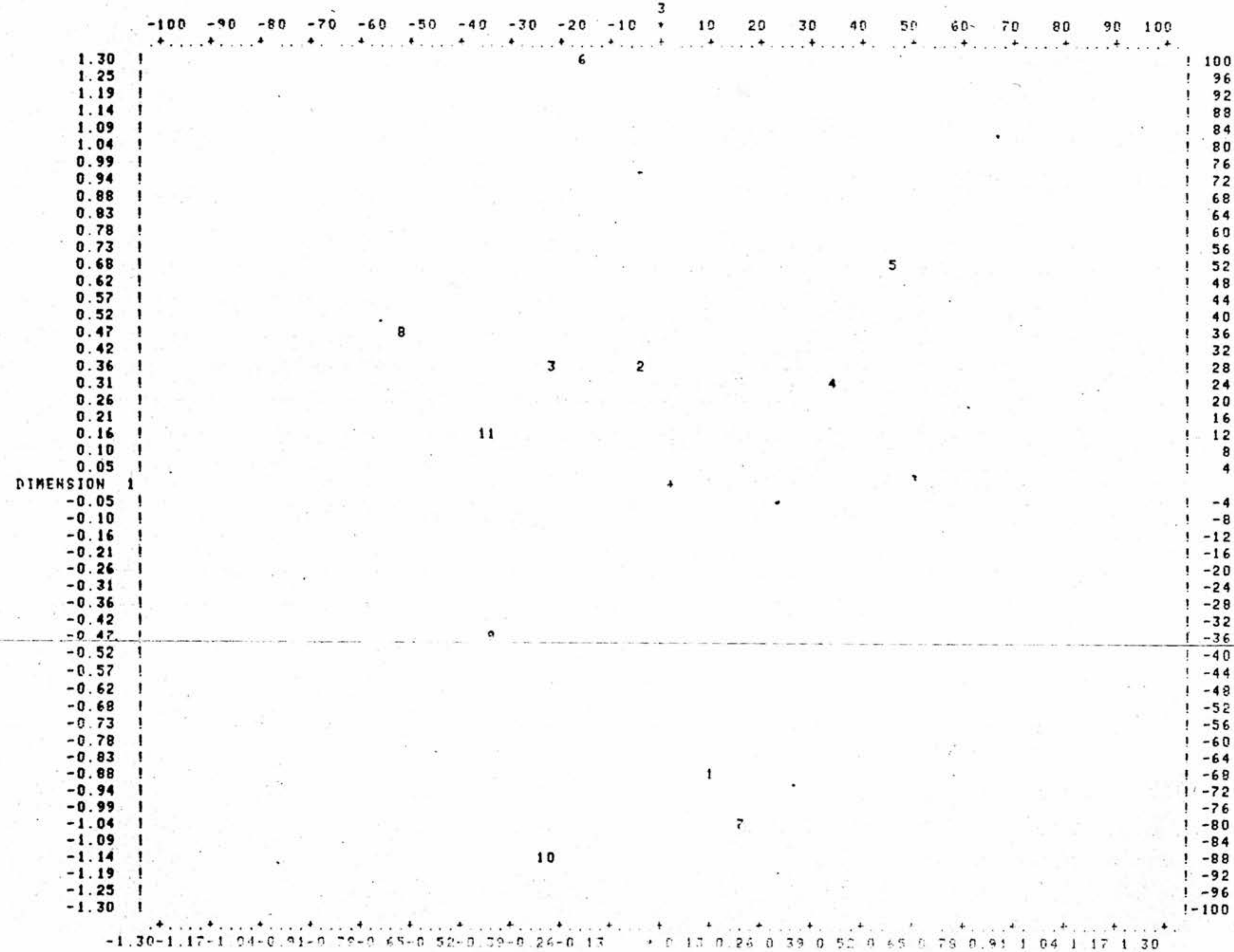


636

6

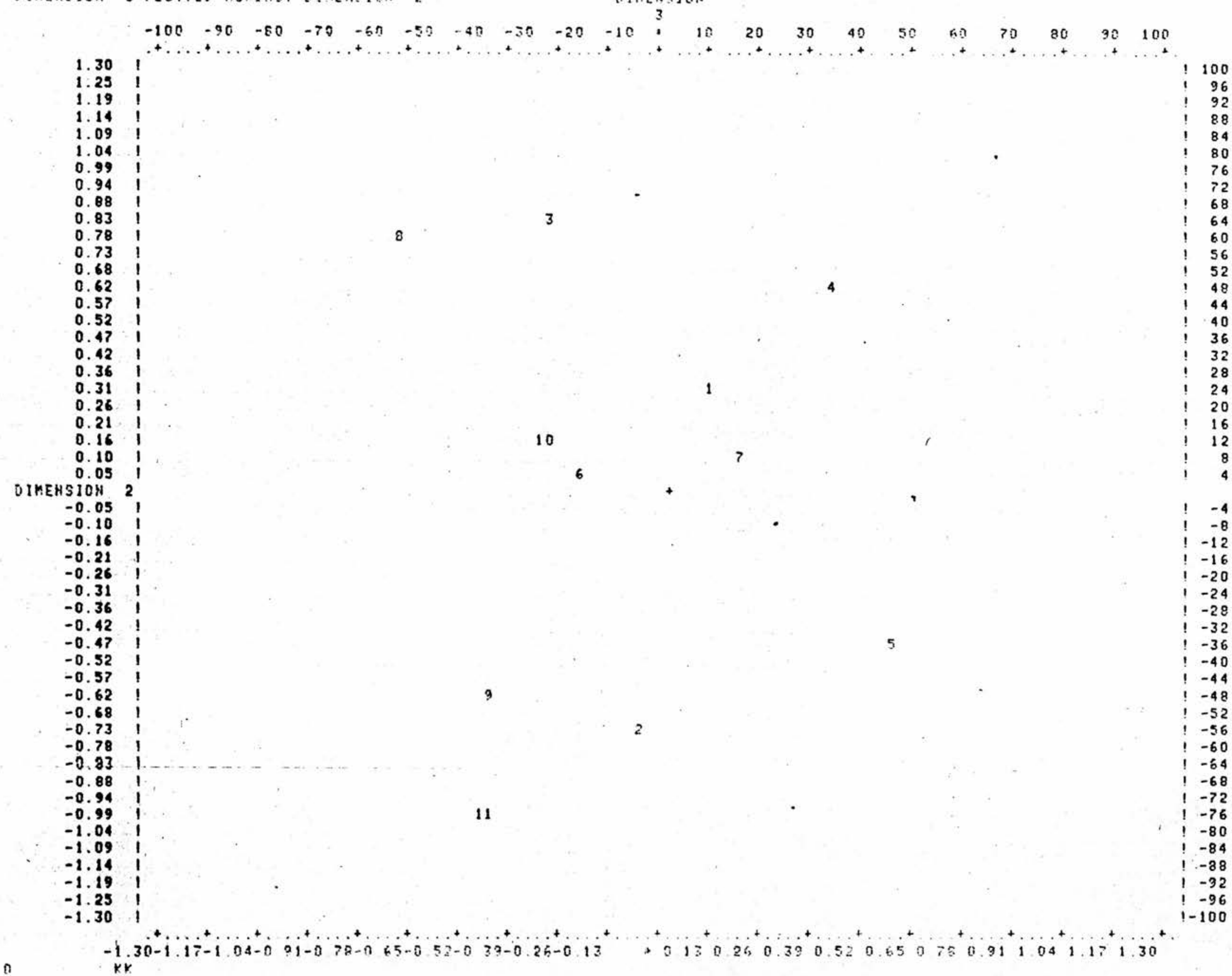
FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 1

DIMENSION
3



7

FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 2



8

SOLUTION IN 2 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

RAW STRESS DHAT	=	0.894451
STRESS DHAT	=	0.085979
RAW STRESS DSTAR	=	1.901423
COEF. ALIEN. DSTAR	=	0.125110

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.170667

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 3
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 11

F I N A L C O N F I G U R A T I O N

1	-0.9152	0.2813
2	0.2654	-0.7094
3	0.4270	0.8413
4	0.2577	0.5046
5	0.8437	-0.5406
6	1.3461	-0.0936
7	-1.0401	0.1686
8	0.5907	0.9596
9	-0.5830	-0.5104
10	-1.1921	0.1263
11	-0.0001	-1.0276
OMEAN	0.0000	0.0000
OSIGMA	0.7904	0.6126

69

KOC3 KOWAREPU

DISTANCES

7	1	0.1682	11	2	0.4145	10	1	0.3174	10	7	0.1578	8	3	0.2020
5	2	0.6024	9	2	0.8715	11	9	0.7793	4	3	0.3768	6	5	0.6725
9	7	0.8185	10	9	0.8811	8	4	0.5638	9	1	0.8586	4	2	1.2141
11	5	0.9743	8	6	1.2961	3	1	1.4543	6	3	1.3111	6	2	1.2438
6	4	1.2420	4	1	1.1940	5	4	1.1983	2	1	1.5413	3	2	1.5591
5	3	1.4434	9	4	1.3180	7	4	1.3406	10	4	1.4984	7	5	2.0129
8	5	1.5214	7	3	1.6139	8	2	1.7004	9	3	1.6873	11	1	1.5971
11	10	1.6590	11	6	1.6385	9	5	1.4270	11	7	1.5850	8	1	1.6516
9	6	1.9736	11	8	2.0731	8	7	1.8125	10	8	1.9680	11	4	1.5538
9	8	1.8810	7	2	1.5733	11	3	1.9171	10	3	1.7700	5	1	1.9415
10	2	1.6801	10	5	2.1423	10	6	2.5476	6	1	2.2922	7	6	2.4006

KOC3 KOWARERU

9

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1682	11	2	0.2729	10	1	0.2729	10	7	0.2729	8	3	0.2729
5	2	0.6024	9	2	0.6750	11	9	0.6750	4	3	0.6750	6	5	0.6750
9	7	0.7544	10	9	0.7544	8	4	0.7544	9	1	0.8586	4	2	1.0942
11	5	1.0942	8	6	1.2771	3	1	1.2771	6	3	1.2771	6	2	1.2771
6	4	1.2771	4	1	1.2771	5	4	1.2771	2	1	1.4405	3	2	1.4405
5	3	1.4405	9	4	1.4405	7	4	1.4405	10	4	1.4984	7	5	1.6443
8	5	1.6443	7	3	1.6443	8	2	1.6443	9	3	1.6443	11	1	1.6443
11	10	1.6443	11	6	1.6443	9	5	1.6443	11	7	1.6443	8	1	1.6516
9	6	1.8313	11	8	1.8313	8	7	1.8313	10	8	1.8313	11	4	1.8313
9	8	1.8313	7	2	1.8313	11	3	1.8313	10	3	1.8313	5	1	1.8313
10	2	1.8313	10	5	2.1423	10	6	2.4135	6	1	2.4135	7	6	2.4135

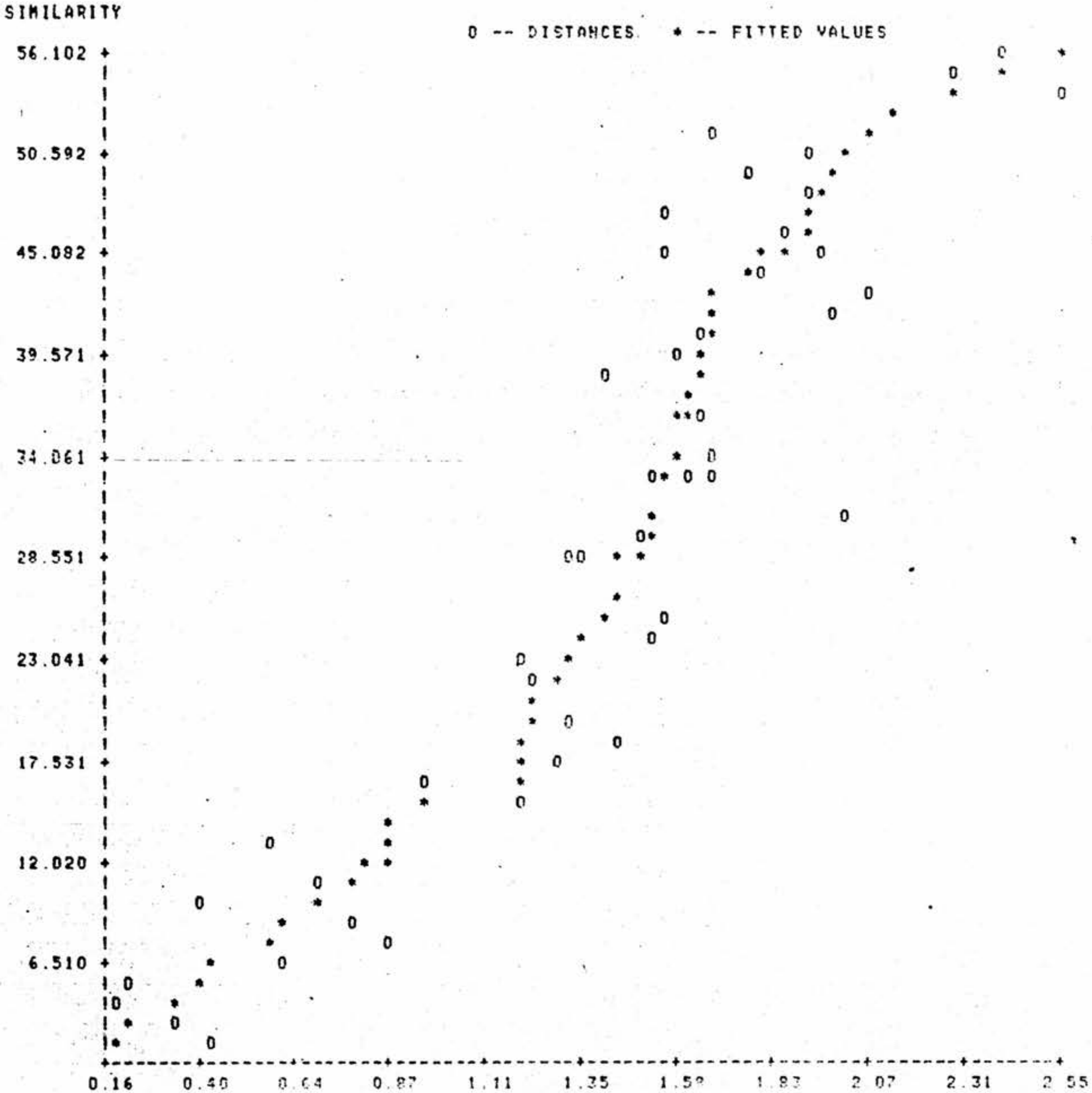
PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1578	11	2	0.1682	10	1	0.2020	10	7	0.3174	8	3	0.3768
5	2	0.4145	9	2	0.5638	11	9	0.6024	4	3	0.6725	6	5	0.7793
9	7	0.8185	10	9	0.8586	8	4	0.8715	9	1	0.8611	4	2	0.9743
11	5	1.1940	8	6	1.1983	3	1	1.2141	6	3	1.2420	6	2	1.2438
6	4	1.2961	4	1	1.3111	5	4	1.3160	2	1	1.3406	3	2	1.4270
5	3	1.4434	9	4	1.4543	7	4	1.4984	10	4	1.5214	7	5	1.5413
8	5	1.5538	7	3	1.5591	8	2	1.5733	9	3	1.5850	11	1	1.5971
11	10	1.6139	11	6	1.6385	9	5	1.6516	11	7	1.6590	8	1	1.6801
9	6	1.6873	11	8	1.7004	8	7	1.7700	10	8	1.8125	11	4	1.8810
9	8	1.9171	7	2	1.9415	11	3	1.9680	10	3	1.9736	5	1	2.0129
10	2	2.0731	10	5	2.1423	10	6	2.2352	6	1	2.4006	7	6	2.5478

10

KOC3.

KOVARERU



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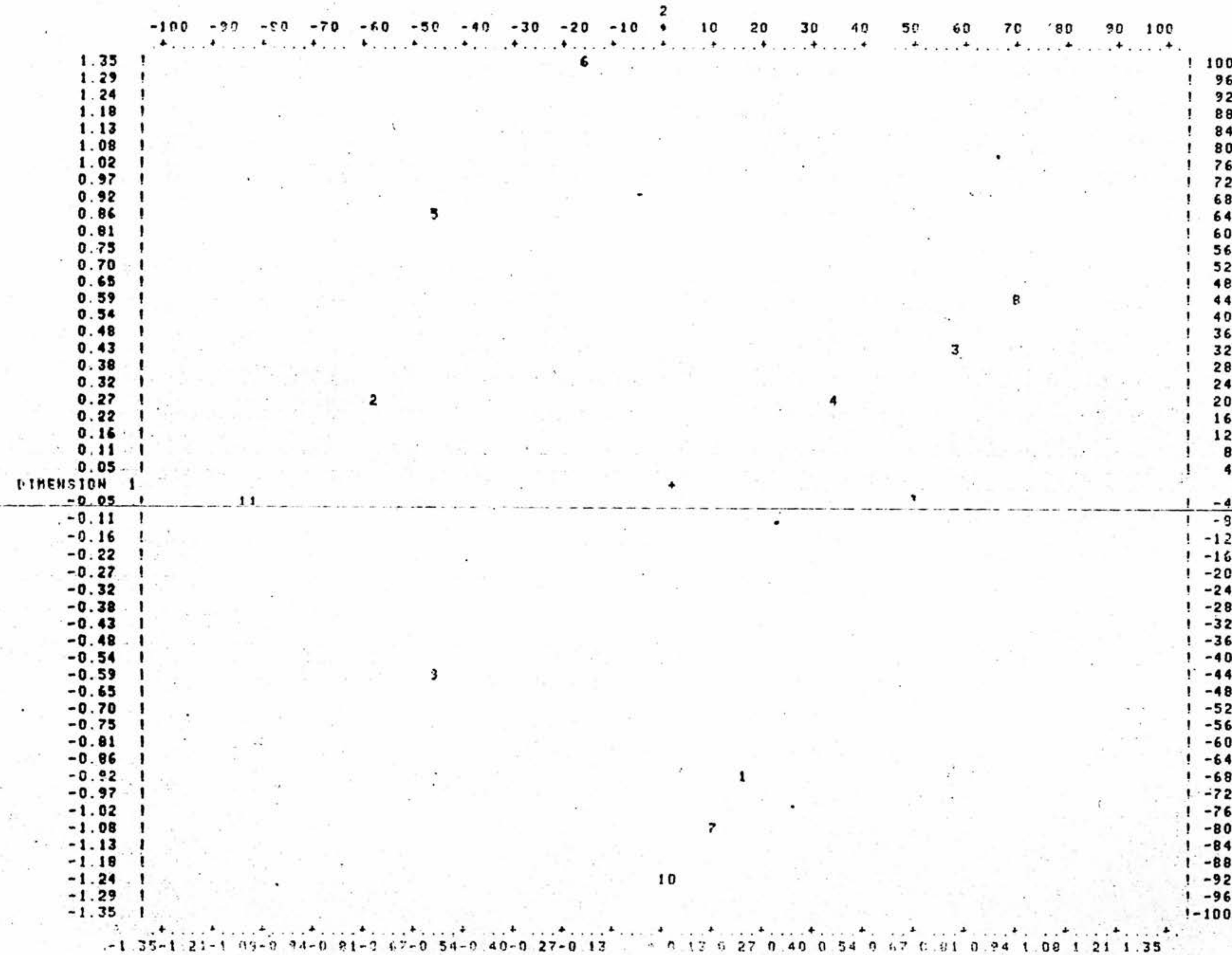
1KOC3 KOWARERU

FINAL CONFIGURATION

DIMENSION 2 PLOTTED AGAINST DIMENSION 1

//



642

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+----------------------------------------------------------------------------+
|                                                                            |
|                          M  D  S  (X)  PROGRAMS                            |
|                                                                            |
|   AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND |
|   LANGUAGE.                                                                |
|                                                                            |
|   PROGRAMS AND SUPPORTING DOCUMENTATION       OTHER ENQUIRIES SHOULD       |
|   ARE DISTRIBUTED FROM                        BE ADDRESSED TO              |
|                                                                            |
|   MDS(X) PROJECT,                             MDS(X) PROJECT,              |
|   PROGRAM LIBRARY UNIT,                       SOCIOLOGICAL RESEARCH UNIT,  |
|   UNIVERSITY OF EDINBURGH,                    UNIVERSITY COLLEGE,          |
|   18 BUCCLEUCH PLACE,                         P.O. BOX 78,                 |
|   EDINBURGH EH8 9LN,                          CARDIFF CF1 1XL,             |
|   U.K.                                        U.K.                         |
|                                                                            |
|   USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN |
|   PUBLISHING RESULTS.                                                      |
|                                                                            |
+----------------------------------------------------------------------------+

         1.     RUN NAME        KOK1
         2.     TASK NAME        KOWARERU
         3.     # OF STIMULI     11
         4.     PRINT DATA       YES
         5.     PARAMETERS       DATA TYPE(1),MINKOWSKI(1.0)
         6.     DIMENSION        2 TO 5
         7.     INPUT FORMAT     (10F5.0)
         8.     READ MATRIX

ROW   2  0.4700E+02

ROW   3  0.2100E+02  0.2400E+02

ROW   4  0.2200E+02  0.1100E+02  0.1000E+02

ROW   5  0.5200E+02  0.6000E+01  0.2600E+02  0.2000E+02

ROW   6  0.5000E+02  0.1800E+02  0.1300E+02  0.2300E+02  0.9000E+01

ROW   7  0.1000E+01  0.3400E+02  0.3200E+02  0.3500E+02  0.5100E+02  0.5500E+02

ROW   8  0.3100E+02  0.2700E+02  0.5000E+01  0.1400E+02  0.2900E+02  0.1900E+02
         0.3600E+02

ROW   9  0.1200E+02  0.7000E+01  0.3900E+02  0.2800E+02  0.4000E+02  0.4300E+02
         0.1700E+02  0.3800E+02

ROW  10  0.4000E+01  0.4600E+02  0.4900E+02  0.2500E+02  0.5300E+02  0.5400E+02
         0.3000E+01  0.4200E+02  0.1500E+02

ROW  11  0.4100E+02  0.2000E+01  0.4500E+02  0.3700E+02  0.1600E+02  0.3300E+02
         0.4400E+02  0.4800E+02  0.8000E+01  0.3000E+02

   10 ROWS ARE READ.
         9.     COMPUTE
1OK1                                                   KOWARERU
```

643

1OK1 KOWARERU

2

SOLUTION IN 3 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

RAW STRESS DHAT = 0.067990
STRESS DHAT = 0.023704
RAW STRESS DSTAR = 0.183876
COEF. ALIEN. DSTAR = 0.038975

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.138224

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 6
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 24

F I N A L C O N F I G U R A T I O N

1	-1.0837	0.1093	-0.0274
2	0.3650	-0.6195	0.0782
3	0.2658	0.8153	-0.2562
4	0.1831	0.3040	0.7821
5	1.1312	-0.3009	0.2588
6	1.1938	0.2261	-0.3501
7	-1.0849	0.0754	-0.0299
8	0.1947	0.8956	-0.0902
9	-0.2803	-0.5343	-0.4559
10	-1.1246	-0.0978	0.1265
11	0.2400	-0.8732	-0.0359
1MEAN	0.0000	0.0000	0.0000
1SIGMA	0.7823	0.5360	0.3173

644

OK1 KOWARERU

DISTANCES

7	1	0.0341	11	2	0.3050	10	7	0.2367	10	1	0.2613	8	3	0.1976
5	2	0.8492	9	2	0.8419	11	9	0.7496	6	5	0.8077	4	3	1.1602
4	2	1.1753	9	1	1.1150	6	3	1.1033	8	4	1.0540	10	9	1.1147
11	5	1.0994	9	7	1.0957	6	2	1.2591	8	6	1.2304	5	4	1.2404
3	1	1.5401	4	1	1.5159	6	4	1.5197	3	2	1.4766	10	4	1.5170
5	3	1.5034	8	2	1.5339	9	4	1.5652	8	5	1.5589	11	10	1.5779
8	1	1.5021	7	3	1.5566	11	6	1.4890	7	2	1.6115	7	4	1.5230
8	7	1.5211	11	4	1.4347	9	8	1.5504	9	3	1.4695	9	5	1.5992
11	1	1.6485	10	8	1.6656	9	6	1.6620	11	7	1.6295	11	3	1.7030
10	2	1.5790	2	1	1.6251	11	8	1.7702	10	3	1.7868	6	1	2.3032
7	5	2.2663	5	1	2.2707	10	5	2.2688	10	6	2.3889	7	6	2.3060

645

OK1 KOWARERU

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0341	11	2	0.2502	10	7	0.2502	10	1	0.2502	8	3	0.2502
5	2	0.8121	9	2	0.8121	11	9	0.8121	6	5	0.8121	4	3	1.1147
4	2	1.1147	9	1	1.1147	6	3	1.1147	8	4	1.1147	10	9	1.1147
11	5	1.1147	9	7	1.1147	6	2	1.2433	8	6	1.2433	5	4	1.2433
3	1	1.5121	4	1	1.5121	6	4	1.5121	3	2	1.5121	10	4	1.5121
5	3	1.5121	8	2	1.5303	9	4	1.5303	8	5	1.5303	11	10	1.5303
8	1	1.5303	7	3	1.5303	11	6	1.5303	7	2	1.5303	7	4	1.5303
8	7	1.5303	11	4	1.5303	9	8	1.5303	9	3	1.5303	9	5	1.5992
11	1	1.6447	10	8	1.6447	9	6	1.6447	11	7	1.6447	11	3	1.6447
10	2	1.6447	2	1	1.6447	11	8	1.7385	10	3	1.7385	6	1	2.2772
7	5	2.2772	5	1	2.2772	10	5	2.2772	10	6	2.3475	7	6	2.3475

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0341	11	2	0.1976	10	7	0.2367	10	1	0.2613	8	3	0.3050
5	2	0.7496	9	2	0.8077	11	9	0.8419	6	5	0.8492	4	3	1.0540
4	2	1.0957	9	1	1.0994	6	3	1.1033	8	4	1.1147	10	9	1.1150
11	5	1.1602	9	7	1.1753	6	2	1.2304	8	6	1.2404	5	4	1.2591
3	1	1.4347	4	1	1.4695	6	4	1.4766	3	2	1.4890	10	4	1.5021
5	3	1.5034	8	2	1.5159	9	4	1.5170	8	5	1.5197	11	10	1.5211
8	1	1.5230	7	3	1.5339	11	6	1.5401	7	2	1.5504	7	4	1.5566
8	7	1.5589	11	4	1.5652	9	8	1.5779	9	3	1.5790	9	5	1.5992
11	1	1.6115	10	8	1.6251	9	6	1.6295	11	7	1.6485	11	3	1.6620
10	2	1.6656	2	1	1.7030	11	8	1.7068	10	3	1.7702	6	1	2.2663
7	5	2.2688	5	1	2.2707	10	5	2.3032	10	6	2.3060	7	6	2.3889

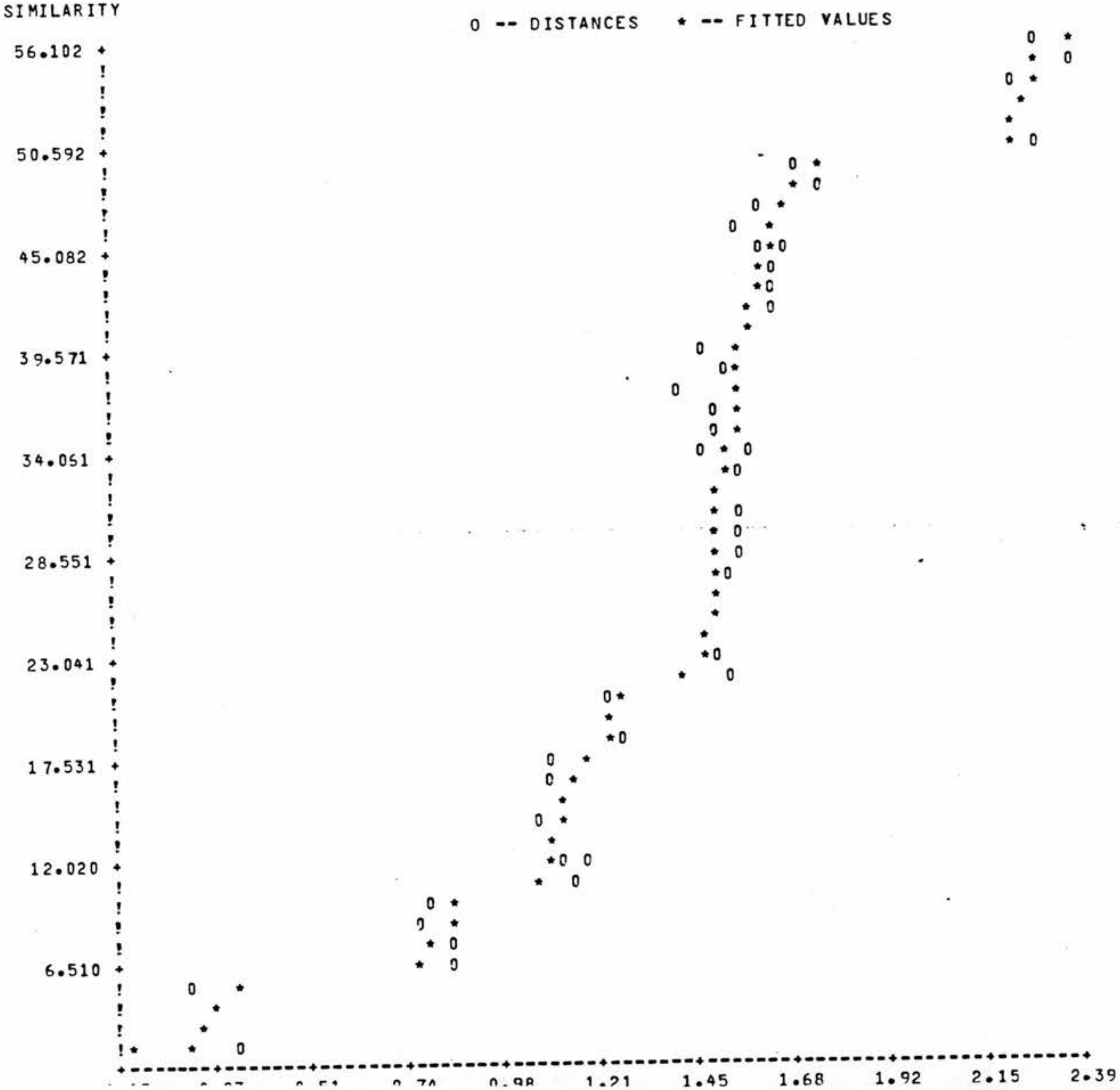
4.

1 SHEPARD DIAGRAM

OK1

KOWARERU

SIMILARITY



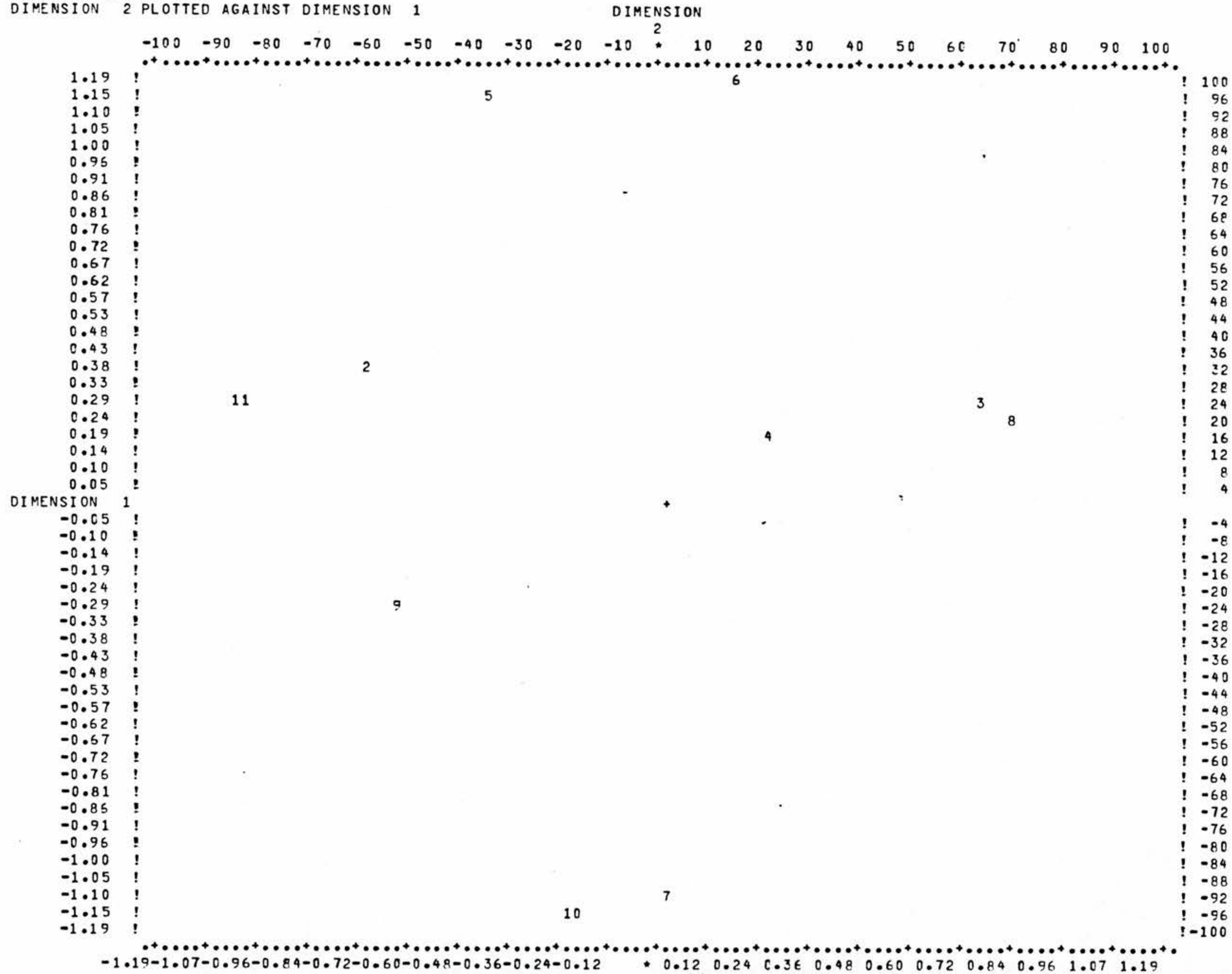
646

10K1 KOWARERU

FINAL CONFIGURATION

DIMENSION 2 PLOTTED AGAINST DIMENSION 1

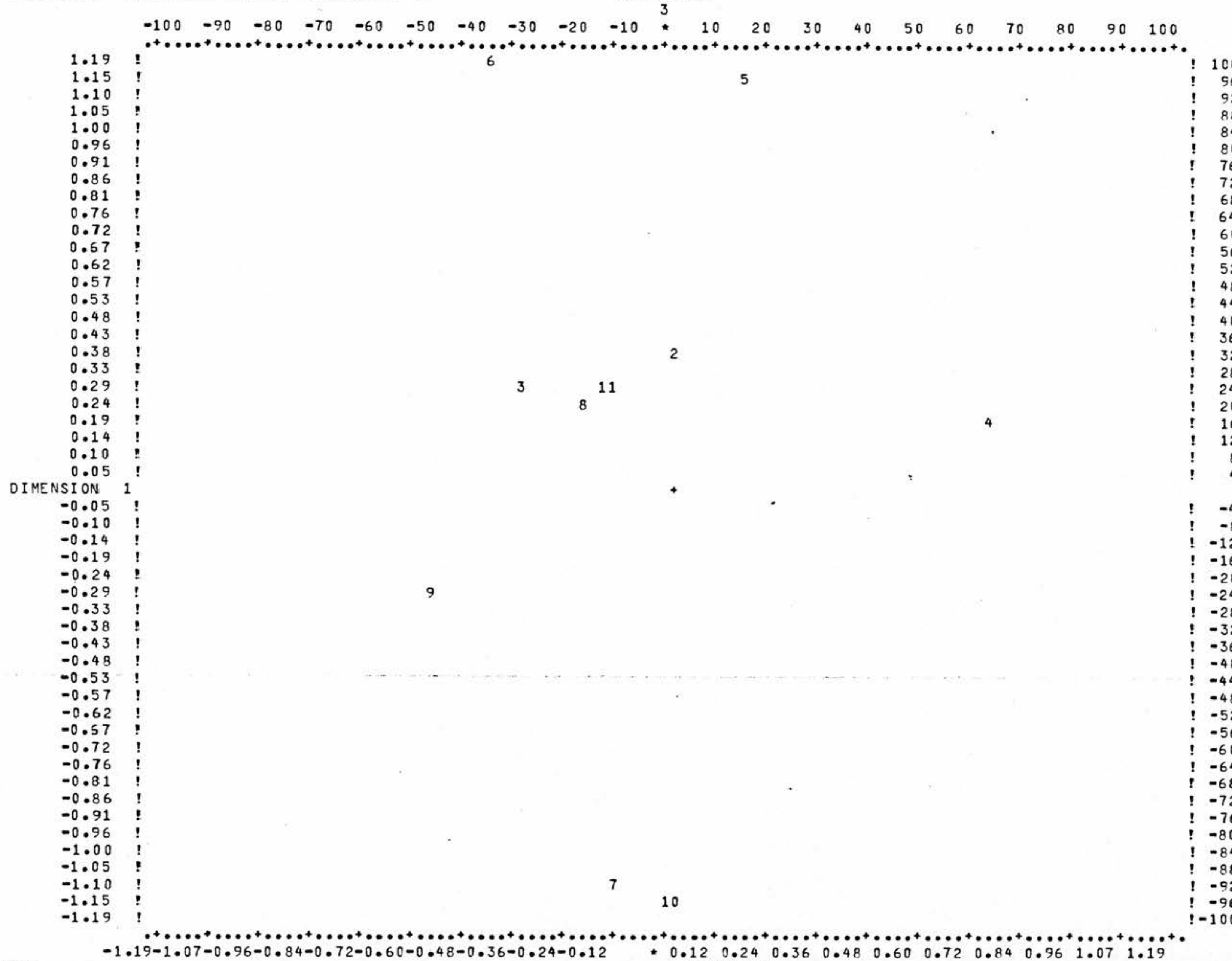
5



1OK1

KOWARERU

FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 1



1OK1

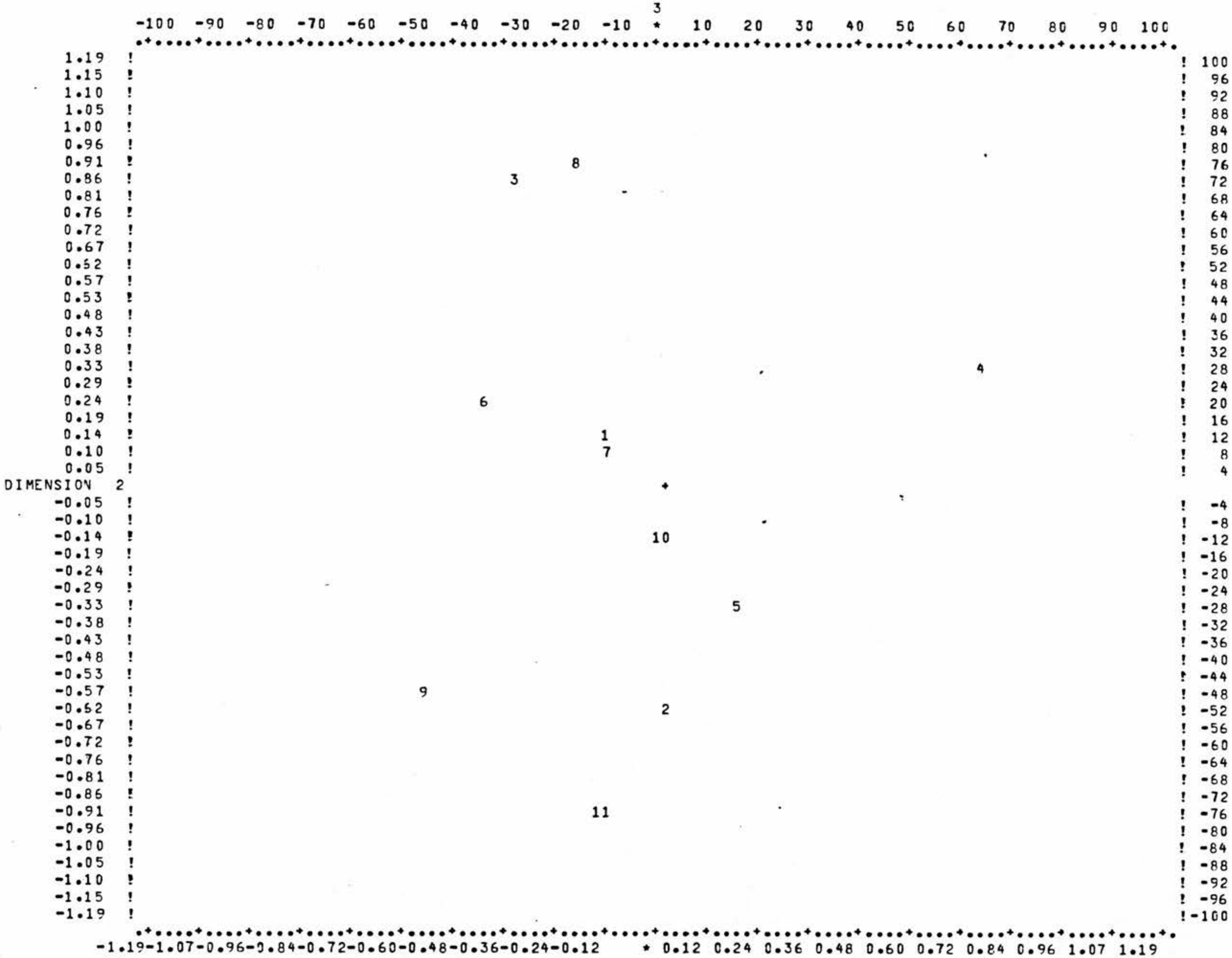
KOWARERU

6

648

7

FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 2



1
OK

649

SOLUTION IN 2 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

```
RAW STRESS DHAT       =    0.631938
STRESS DHAT           =    0.072268
RAW STRESS DSTAR      =    1.190877
COEF. ALIEN. DSTAR    =    0.099085
```

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.170667

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 2
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 11

F I N A L   C O N F I G U R A T I O N

1	-1.0441	0.2138
2	0.3846	-0.5589
3	0.3975	0.7717
4	0.1840	0.3499
5	1.1405	-0.4103
6	1.2642	0.2205
7	-1.1450	0.1767
8	0.2438	0.9722
9	-0.4207	-0.6391
10	-1.1994	-0.1191
11	0.1946	-0.9774
IMEAN	0.0000	0.0000
ISIGMA	0.8176	0.5758

OK1 KOWARERU

DISTANCES

7	1	0.1074	11	2	0.4596	10	7	0.3007	10	1	0.3673	8	3	0.2527
5	2	0.7704	9	2	0.8092	11	9	0.7021	6	5	0.6428	4	3	0.4728
4	2	0.9306	9	1	1.0565	6	3	1.0271	8	4	0.6252	10	9	0.9364
11	5	1.1028	9	7	1.0910	6	2	1.1752	8	6	1.2675	5	4	1.2218
3	1	1.5459	4	1	1.2356	6	4	1.0880	3	2	1.3306	10	4	1.4607
5	3	1.3961	8	2	1.5376	9	4	1.1592	8	5	1.6478	11	10	1.6371
8	1	1.4946	7	3	1.6533	11	6	1.6059	7	2	1.6972	7	4	1.3402
8	7	1.6005	11	4	1.3273	9	8	1.7430	9	3	1.6309	9	5	1.5778
11	1	1.7186	10	8	1.8093	9	6	1.8915	11	7	1.7682	11	3	1.7608
10	2	1.6439	2	1	1.6242	11	8	1.9502	10	3	1.8286	6	1	2.3084
7	5	2.3596	5	1	2.2720	10	5	2.3579	10	6	2.4869	7	6	2.4096

651

OK1 KOWARERU

9

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1074	11	2	0.3451	10	7	0.3451	10	1	0.3451	8	3	0.3451
5	2	0.6795	9	2	0.6795	11	9	0.6795	6	5	0.6795	4	3	0.6795
4	2	0.9099	9	1	0.9099	6	3	0.9099	8	4	0.9099	10	9	0.9364
11	5	1.0969	9	7	1.0969	6	2	1.1752	8	6	1.2446	5	4	1.2446
3	1	1.2898	4	1	1.2898	6	4	1.2898	3	2	1.3306	10	4	1.3884
5	3	1.3884	8	2	1.3884	9	4	1.3884	8	5	1.5560	11	10	1.5560
8	1	1.5560	7	3	1.5560	11	6	1.5560	7	2	1.5560	7	4	1.5560
8	7	1.5560	11	4	1.5560	9	8	1.6506	9	3	1.6506	9	5	1.6506
11	1	1.7186	10	8	1.7497	9	6	1.7497	11	7	1.7497	11	3	1.7497
10	2	1.7497	2	1	1.7497	11	8	1.8894	10	3	1.8894	6	1	2.3084
7	5	2.3158	5	1	2.3158	10	5	2.3579	10	6	2.4482	7	6	2.4482

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

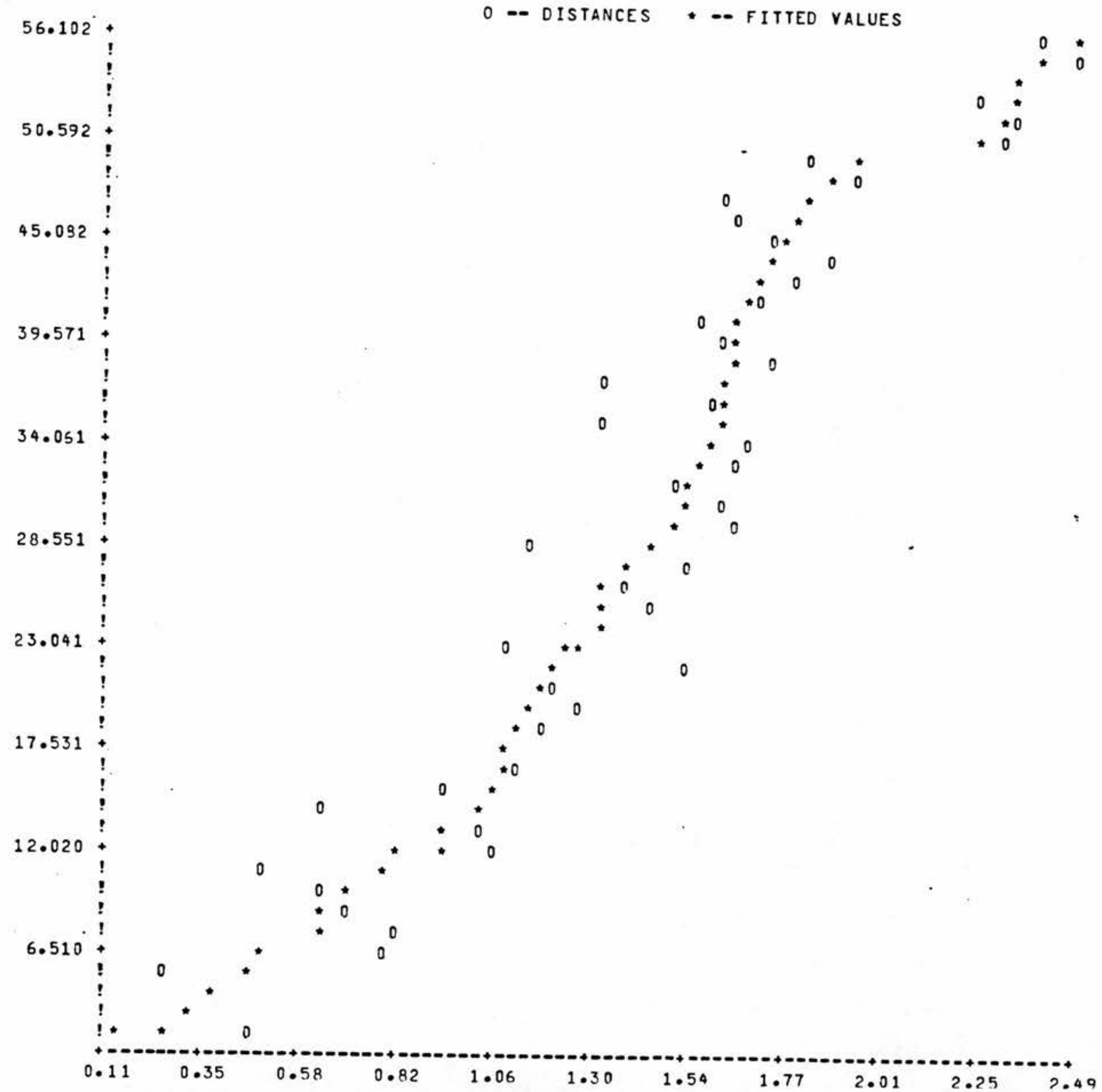
7	1	0.1074	11	2	0.2527	10	7	0.3007	10	1	0.3673	8	3	0.4596
5	2	0.4728	9	2	0.6252	11	9	0.6428	6	5	0.7021	4	3	0.7784
4	2	0.8092	9	1	0.9306	6	3	0.9364	8	4	1.0271	10	9	1.0565
11	5	1.0880	9	7	1.0910	6	2	1.1028	8	6	1.1592	5	4	1.1752
3	1	1.2218	4	1	1.2356	6	4	1.2675	3	2	1.3273	10	4	1.3396
5	3	1.3402	8	2	1.3961	9	4	1.4607	8	5	1.4946	11	10	1.5376
8	1	1.5459	7	3	1.5778	11	6	1.6005	7	2	1.6059	7	4	1.6242
8	7	1.6309	11	4	1.6371	9	8	1.6439	9	3	1.6478	9	5	1.6533
11	1	1.6972	10	8	1.7186	9	6	1.7430	11	7	1.7608	11	3	1.7682
10	2	1.8093	2	1	1.8286	11	8	1.8915	10	3	1.9502	6	1	2.2720
7	5	2.3084	5	1	2.3579	10	5	2.3596	10	6	2.4096	7	6	2.4869

SHEPARD DIAGRAM

OK1

KOWARERU

SIMILARITY



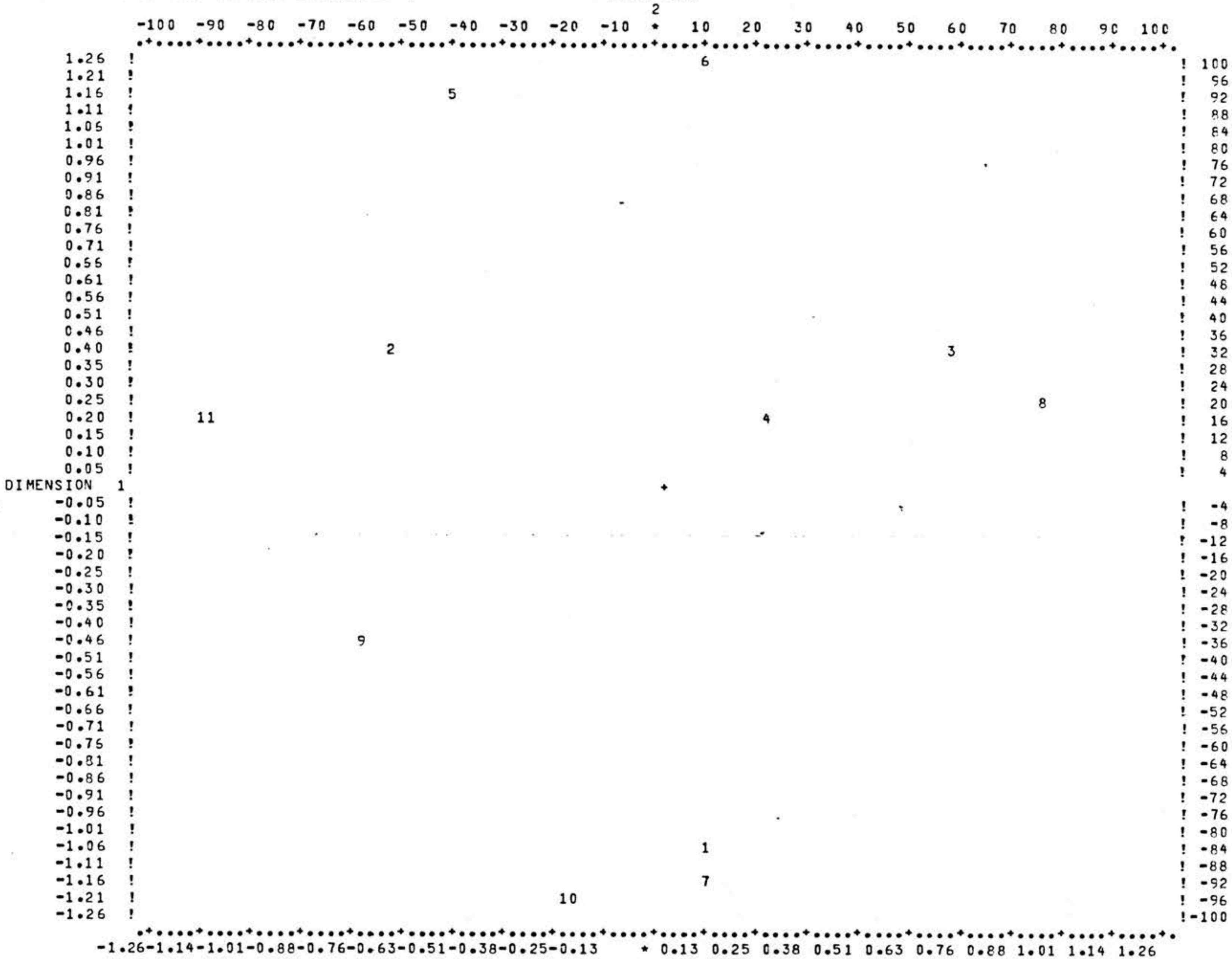
10

652

1OK1
FINAL CONFIGURATION
DIMENSION 2 PLOTTED AGAINST DIMENSION 1

KOWARERU

//



1

10. FINISH

653

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+------------------------------------------------------------------------------+
|                                                                              |
|                          M  D  S  (X)  PROGRAMS                              |
|                                                                              |
|     AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND |
|     LANGUAGE.                                                                |
|                                                                              |
|     PROGRAMS AND SUPPORTING DOCUMENTATION      OTHER ENQUIRIES SHOULD        |
|     ARE DISTRIBUTED FROM                       BE ADDRESSED TO               |
|                                                                              |
|     MDS(X) PROJECT,                            MDS(X) PROJECT,               |
|     PROGRAM LIBRARY UNIT,                      SOCIOLOGICAL RESEARCH UNIT,   |
|     UNIVERSITY OF EDINBURGH,                   UNIVERSITY COLLEGE,           |
|     18 BUCCLEUCH PLACE,                        P.O. BOX 78,                  |
|     EDINBURGH EH8 9LN,                         CARDIFF CF1 1XL,              |
|     U.K.                                       U.K.                          |
|                                                                              |
|     USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN |
|     PUBLISHING RESULTS.                                                      |
|                                                                              |
+------------------------------------------------------------------------------+

          1.     RUN NAME        KOK2
          2.     TASK NAME       KOWARERU
          3.     £ OF STIMULI    11
          4.     PRINT DATA      YES
          5.     PARAMETERS      DATA TYPE(1),MINKOWSKI(1.0)
          6.     DIMENSION       2 TO 5
          7.     INPUT FORMAT    (10F5.0)
          8.     READ MATRIX
 ROW   2  0.2000E+02

 ROW   3  0.1600E+02  0.2700E+02

 ROW   4  0.2400E+02  0.1900E+02  0.9000E+01

 ROW   5  0.5100E+02  0.7000E+01  0.3300E+02  0.2500E+02

 ROW   6  0.5200E+02  0.2200E+02  0.1500E+02  0.2100E+02  0.6000E+01

 ROW   7  0.1000E+01  0.5300E+02  0.3200E+02  0.3000E+02  0.4600E+02  0.5500E+02

 ROW   8  0.3100E+02  0.2800E+02  0.5000E+01  0.1000E+02  0.2600E+02  0.1700E+02
          0.4400E+02

 ROW   9  0.1100E+02  0.1300E+02  0.3500E+02  0.1800E+02  0.3800E+02  0.3900E+02
          0.1200E+02  0.3400E+02

 ROW  10  0.3000E+01  0.4900E+02  0.5000E+02  0.4000E+02  0.5400E+02  0.4700E+02
          0.4000E+01  0.2900E+02  0.1400E+02

 ROW  11  0.4200E+02  0.2000E+01  0.4800E+02  0.4300E+02  0.2300E+02  0.4100E+02
          0.3700E+02  0.4500E+02  0.8000E+01  0.3600E+02

   10 ROWS ARE READ.
          9.     COMPUTE
 10K2                                         KOWARERU
```

10K2 KOWARERU

2

SOLUTION IN 3 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

RAW STRESS DHAT	=	0.326599
STRESS DHAT	=	0.071954
RAW STRESS DSTAR	=	0.745804
COEF. ALIEN. DSTAR	=	0.078449

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.138224

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 4
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 19

658

F I N A L C O N F I G U R A T I O N

1	-0.8093	-0.2958	0.1557
2	0.2163	0.8650	-0.2416
3	0.5882	-0.7978	-0.0288
4	0.4325	-0.4753	-0.7093
5	0.6238	0.6765	0.6146
6	0.8179	0.0752	0.7033
7	-0.9911	-0.2200	0.1903
8	0.6669	-0.8100	-0.2115
9	-0.5548	0.3520	-0.3798
10	-0.9314	-0.2714	0.3899
11	-0.0290	0.9516	-0.4827
DMEAN	0.0000	0.0000	0.0000
DSIGMA	0.6695	0.6031	0.4337

OK2 KOWARERU

DISTANCES

7	1	0.1857	11	2	0.3546	10	1	0.2652	10	7	0.2085	8	3	0.1993
6	5	0.6286	5	2	0.9668	11	9	0.8241	4	3	0.7690	8	4	0.6440
9	1	0.8700	9	7	0.9431	9	2	0.9613	10	9	1.0494	6	3	1.1698
3	1	1.4964	8	6	1.2888	9	4	1.3520	4	2	1.4359	2	1	1.5992
6	4	1.5678	6	2	1.3646	11	5	1.3061	4	1	1.5239	5	4	1.7652
8	5	1.7012	3	2	1.7171	8	2	1.7348	10	8	1.7907	7	4	1.6952
8	1	1.6058	7	3	1.6764	5	3	1.6090	9	8	1.7163	9	3	1.6797
11	10	1.7525	11	7	1.7015	9	5	1.5985	9	6	1.7922	10	4	1.7635
11	6	1.6953	11	1	1.6039	11	4	1.5166	8	7	1.7865	11	8	1.9133
7	5	1.9242	10	6	1.8126	11	3	1.9098	10	2	1.7342	10	3	1.6618
5	1	1.7916	6	1	1.7587	7	2	1.7191	10	5	1.8351	7	6	1.9154

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1857	11	2	0.2569	10	1	0.2569	10	7	0.2569	8	3	0.2569
6	5	0.6286	5	2	0.8010	11	9	0.8010	4	3	0.8010	8	4	0.8010
9	1	0.8700	9	7	0.9431	9	2	0.9613	10	9	1.0494	6	3	1.1698
3	1	1.3791	8	6	1.3791	9	4	1.3791	4	2	1.4359	2	1	1.4595
6	4	1.4595	6	2	1.4595	11	5	1.4595	4	1	1.5230	5	4	1.6903
8	5	1.6903	3	2	1.6903	8	2	1.6903	10	8	1.6903	7	4	1.6903
8	1	1.6903	7	3	1.6903	5	3	1.6903	9	8	1.6903	9	3	1.6903
11	10	1.6903	11	7	1.6903	9	5	1.6903	9	6	1.6903	10	4	1.6903
11	6	1.6903	11	1	1.6903	11	4	1.6903	8	7	1.7865	11	8	1.8028
7	5	1.8028	10	6	1.8028	11	3	1.8028	10	2	1.8028	10	3	1.8028
5	1	1.8028	6	1	1.8028	7	2	1.8028	10	5	1.8351	7	6	1.9154

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

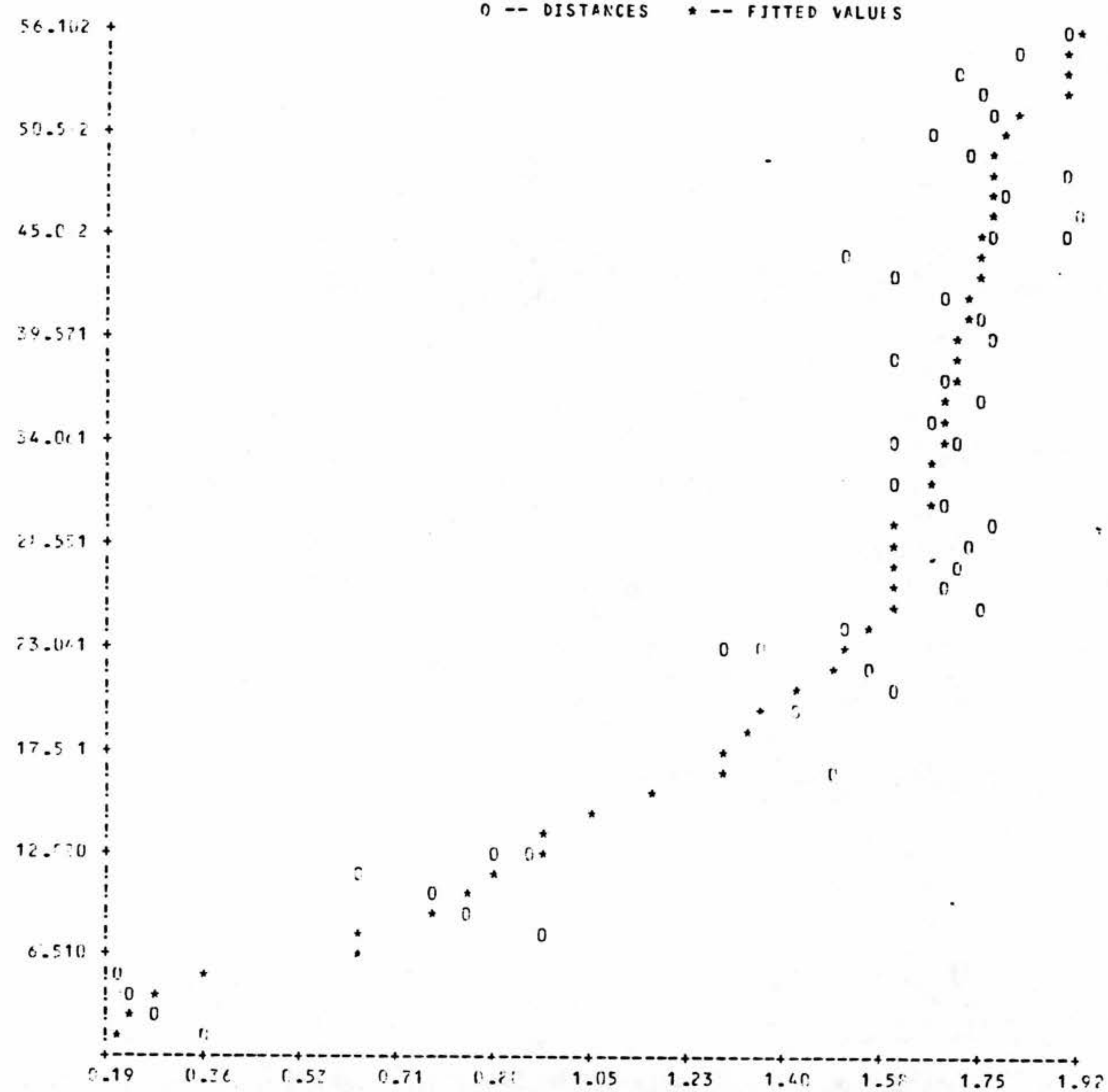
7	1	0.1857	11	2	0.1993	10	1	0.2085	10	7	0.2652	8	3	0.3546
6	5	0.6286	5	2	0.6440	11	9	0.7690	4	3	0.8241	8	4	0.8700
9	1	0.9431	9	7	0.9613	9	2	0.9668	10	9	1.0494	6	3	1.1698
3	1	1.2888	8	6	1.3061	9	4	1.3520	4	2	1.364[illegible]	2	1	1.4359
6	4	1.4964	6	2	1.5166	11	5	1.5239	4	1	1.567[illegible]	5	4	1.5985
8	5	1.5992	3	2	1.6039	8	2	1.6058	10	8	1.6090	7	4	1.6613
8	1	1.6764	7	3	1.6797	5	3	1.6932	9	8	1.6955	9	3	1.7012
11	10	1.7015	11	7	1.7162	9	5	1.7171	9	6	1.7191	10	4	1.7342
11	6	1.7346	11	1	1.7525	11	4	1.7587	8	7	1.7635	11	8	1.7652
7	5	1.7865	10	6	1.7907	11	3	1.7916	10	2	1.7922	10	3	1.8126
5	1	1.8351	6	1	1.9055	7	2	1.9133	10	5	1.9154	7	6	1.9242

4

OK2

KOMAPERU

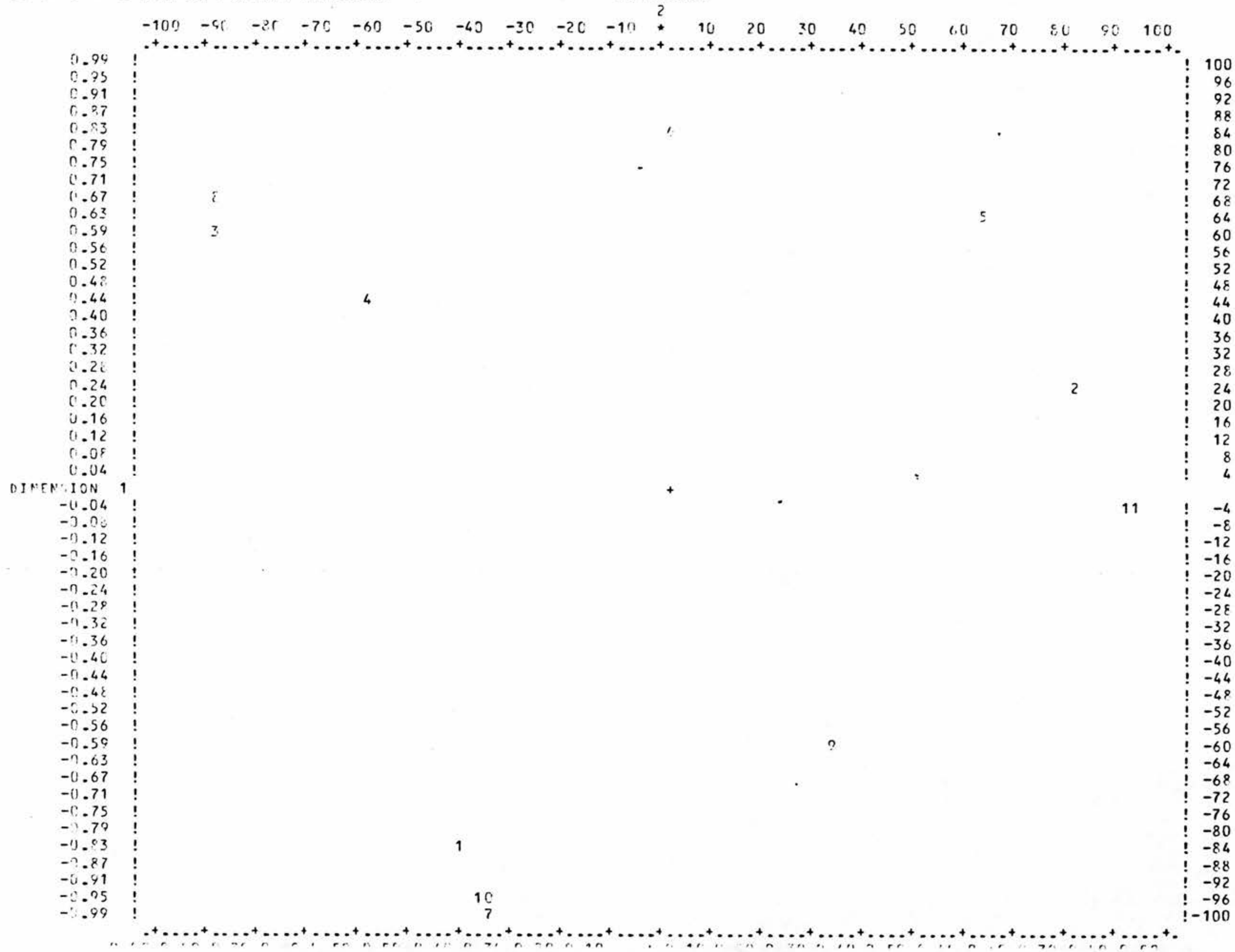
SIMILARITY



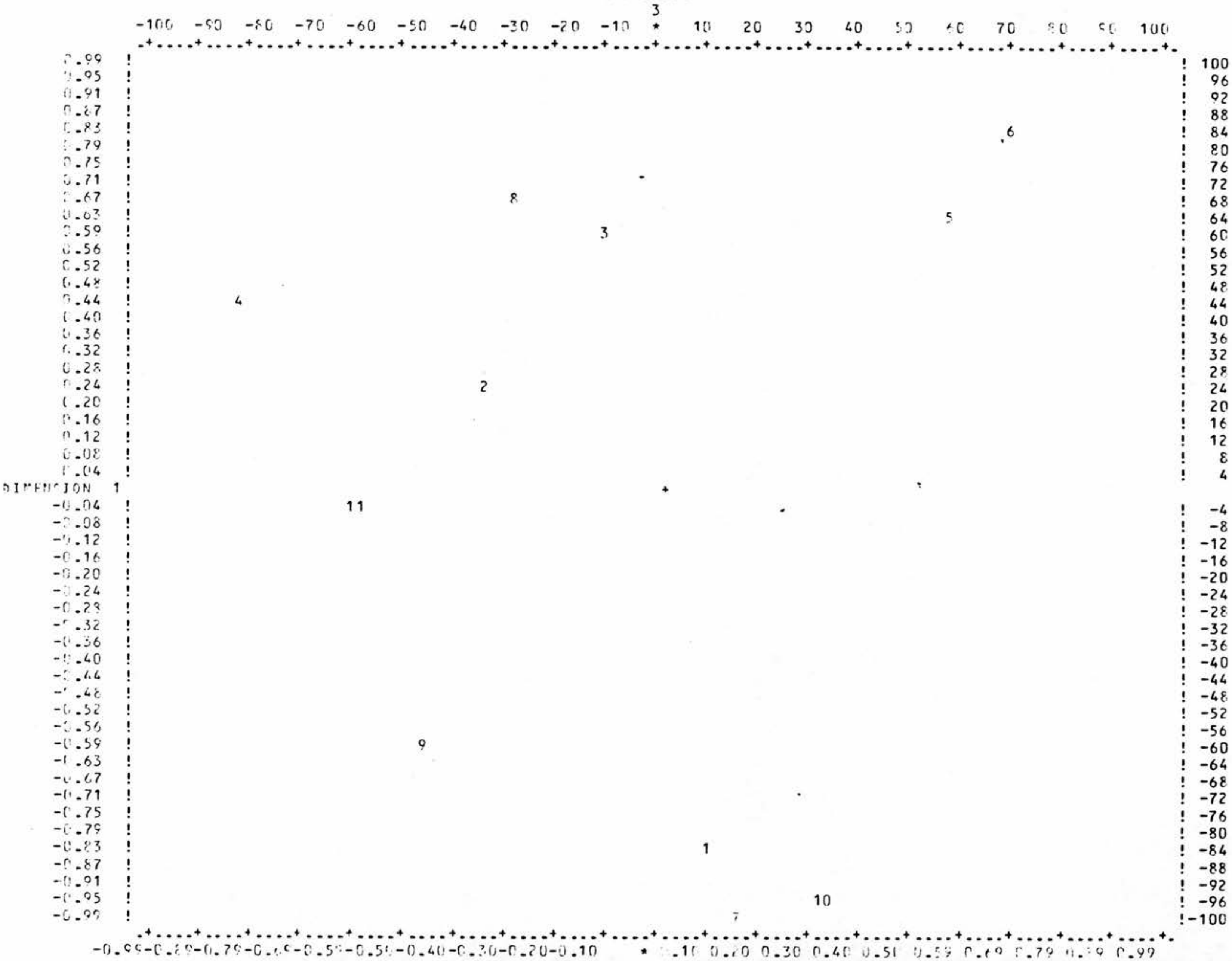
5

10K2
FINAL CONFIGURATION
DIMENSION 2 PLOTTED AGAINST DIMENSION 1

KOKARERU

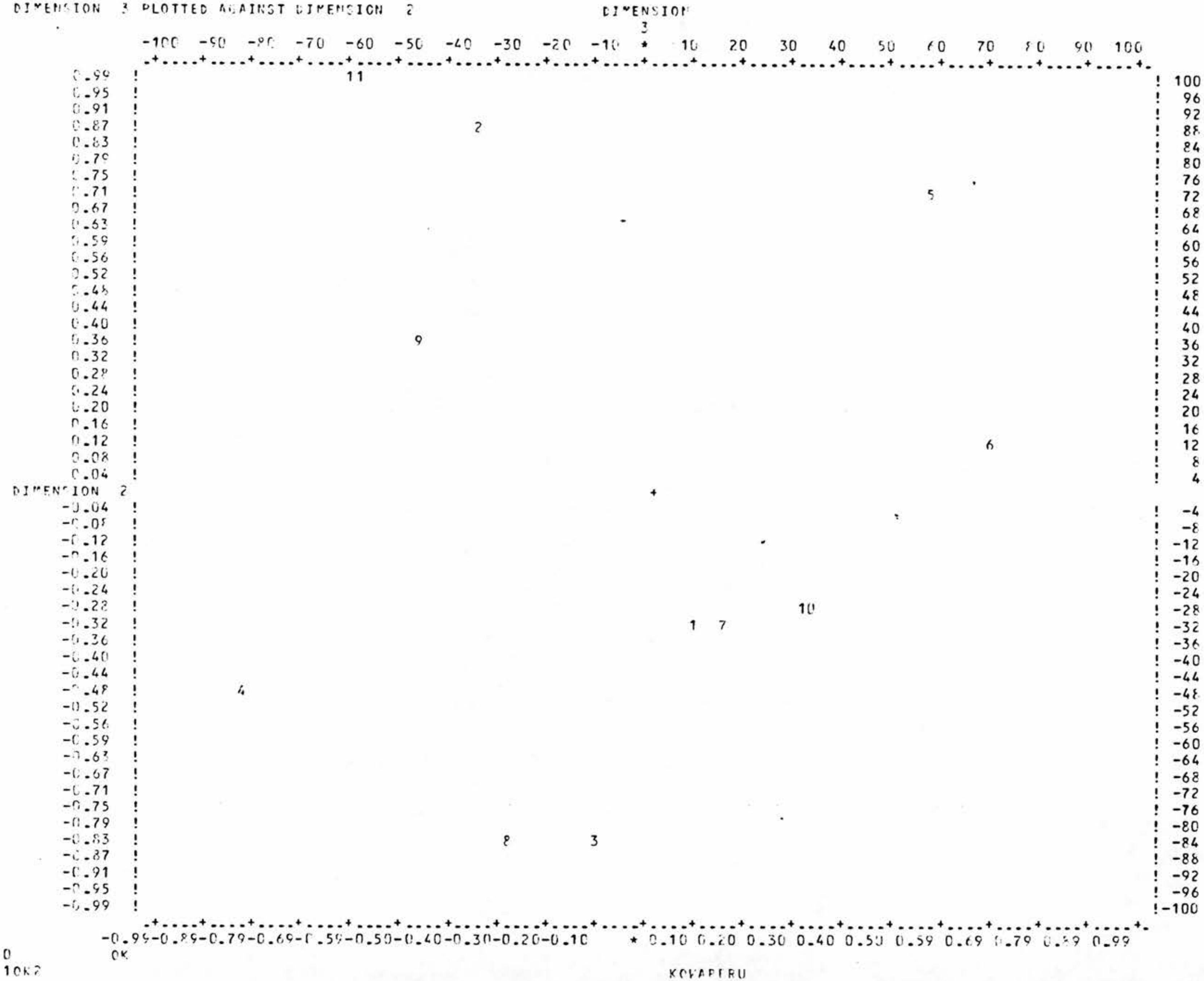


FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 1



6

FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 2



0
10K?

660

SOLUTION IN 2 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

```
RAW STRESS DHAT      =    0.892040
STRESS DHAT          =    0.085562
RAW STRESS DSTAR     =    2.364077
COEF. ALIEN. DSTAR   =    0.139436
```

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.170667

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 7
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 14

F I N A L   C O N F I G U R A T I O N

1	-0.8538	-0.0991
2	0.4374	0.7575
3	0.2459	-0.9962
4	0.2757	-0.5184
5	1.0457	0.4226
6	1.1728	-0.0560
7	-1.1596	-0.1644
8	0.4131	-0.9488
9	-0.4373	0.5201
10	-1.1945	0.0276
11	0.0546	1.0551
DMEAN	0.0000	0.0000
DSIGMA	0.7782	0.6280

OK2 KOWARERU

DISTANCES

7	1	0.3126	11	2	0.4849	10	1	0.3634	10	7	0.1951	8	3	0.1738
6	5	0.4952	5	2	0.6944	11	9	0.7267	4	3	0.4787	8	4	0.4518
9	1	0.7463	9	7	0.9951	9	2	0.9063	10	9	0.9033	6	3	1.3202
3	1	1.4192	8	6	1.1722	9	4	1.2596	4	2	1.2861	2	1	1.5495
6	4	1.0092	6	2	1.0967	11	5	1.1757	4	1	1.204[illegible]	5	4	1.2158
8	5	1.5102	3	2	1.7641	8	2	1.7065	10	8	1.8809	7	4	1.4783
8	1	1.5255	7	3	1.6332	5	3	1.6286	9	8	1.6973	9	3	1.6631
11	10	1.6174	11	7	1.7203	9	5	1.4861	9	6	1.7109	10	4	1.5683
11	6	1.5764	11	1	1.4683	11	4	1.5889	8	7	1.7575	11	8	2.0357
7	5	2.2820	10	6	2.3687	11	3	2.0602	10	2	1.7877	10	3	1.7672
5	1	1.9695	6	1	2.0271	7	2	1.9439	10	5	2.2747	7	6	2.3349

OK2 KOW;RERU

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

PAIR		DHAT												
7	1	0.3060	11	2	0.3060	10	1	0.3060	10	7	0.3060	8	3	0.3060
6	5	0.4952	5	2	0.5879	11	9	0.5879	4	3	0.5879	8	4	0.5879
9	1	0.7463	9	7	0.9349	9	2	0.9349	10	9	0.9349	6	3	1.2463
3	1	1.2463	8	6	1.2463	9	4	1.2463	4	2	1.2463	2	1	1.2463
6	4	1.2463	6	2	1.2463	11	5	1.2463	4	1	1.2463	5	4	1.2463
8	5	1.5102	3	2	1.6302	8	2	1.6302	10	8	1.6302	7	4	1.6302
8	1	1.6302	7	3	1.6302	5	3	1.6302	9	8	1.6302	9	3	1.6302
11	10	1.6302	11	7	1.6302	9	5	1.6302	9	6	1.6302	10	4	1.6302
11	6	1.6302	11	1	1.6302	11	4	1.6302	8	7	1.7575	11	8	2.0158
7	5	2.0158	10	6	2.0158	11	3	2.0158	10	2	2.0158	10	3	2.0158
5	1	2.0158	6	1	2.0158	7	2	2.0158	10	5	2.2747	7	6	2.3349

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

PAIR		DSTAR												
7	1	0.1738	11	2	0.1951	10	1	0.3126	10	7	0.3634	8	3	0.4518
6	5	0.4787	5	2	0.4849	11	9	0.4952	4	3	0.6944	8	4	0.7267
9	1	0.7463	9	7	0.9032	9	2	0.9063	10	9	0.9951	6	3	1.0092
3	1	1.0967	8	6	1.1722	9	4	1.1757	4	2	1.204[illegible]	2	1	1.2158
6	4	1.2596	6	2	1.2861	11	5	1.3202	4	1	1.4192	5	4	1.4688
8	5	1.4783	3	2	1.4861	8	2	1.5102	10	8	1.5255	7	4	1.5495
8	1	1.5683	7	3	1.5764	5	3	1.5859	9	8	1.6174	9	3	1.6286
11	10	1.6332	11	7	1.6631	9	5	1.6973	9	6	1.7065	10	4	1.7100
11	6	1.7208	11	1	1.7575	11	4	1.7641	8	7	1.7672	11	8	1.7877
7	5	1.8439	10	6	1.[illegible]	11	3	1.9698	10	2	2.0271	10	3	2.0357
5	1	2.0602	6	1	2.2747	7	2	2.2820	10	5	2.334[illegible]	7	6	2.3688

662

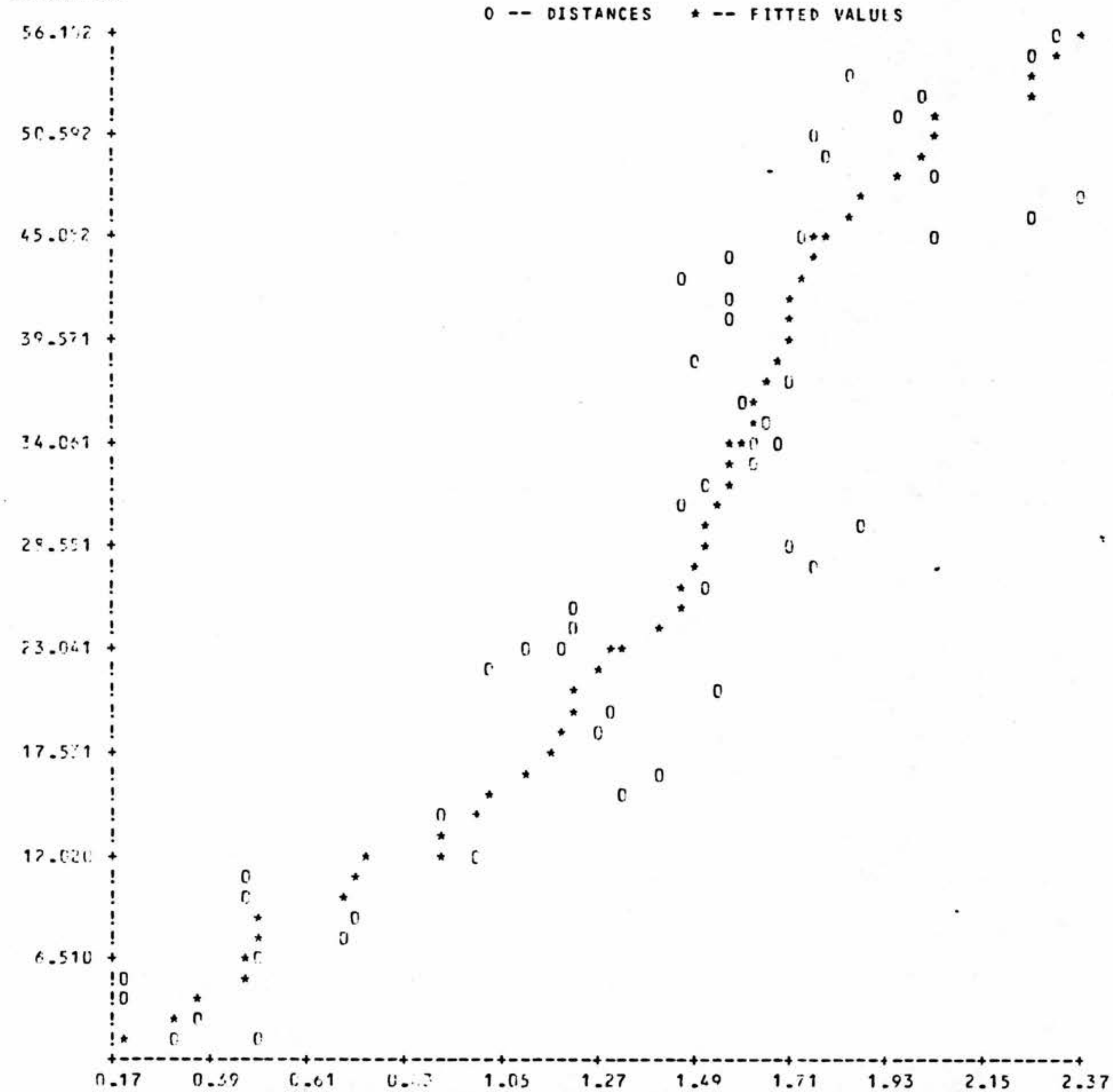
9

10

OK2

KOWAPERU

SIMILARITY

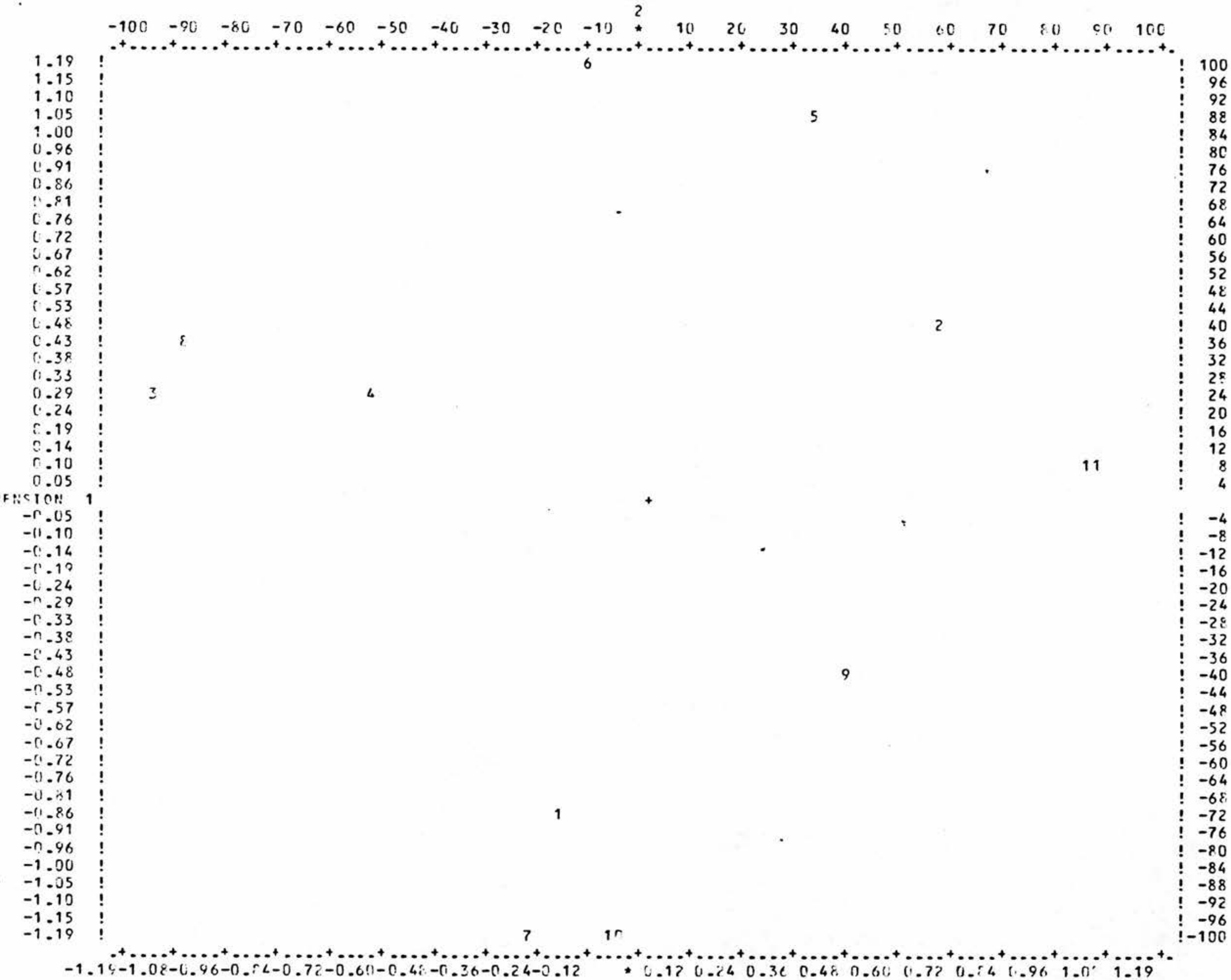


663

10K2
FINAL CONFIGURATION
DIMENSION 2 PLOTTED AGAINST DIMENSION 1

KOWARERU

11



1

10. FINISH

```
+------------------------------------------------------------------------------------+
|                              M D S (X) PROGRAMS                                    |
|                                                                                    |
|   AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND  |
|   LANGUAGE.                                                                        |
|                                                                                    |
|   PROGRAMS AND SUPPORTING DOCUMENTATION          OTHER ENQUIRIES SHOULD            |
|   ARE DISTRIBUTED FROM                           BE ADDRESSED TO                   |
|                                                                                    |
|   MDS(X) PROJECT,                                MDS(X) PROJECT,                   |
|   PROGRAM LIBRARY UNIT,                          SOCIOLOGICAL RESEARCH UNIT,       |
|   UNIVERSITY OF EDINBURGH,                       UNIVERSITY COLLEGE,               |
|   18 BUCCLEUCH PLACE,                            P.O. BOX 78,                      |
|   EDINBURGH EH8 9LN,                             CARDIFF CF1 1XL,                  |
|   U.K.                                           U.K.                              |
|                                                                                    |
|   USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN     |
|   PUBLISHING RESULTS.                                                              |
+------------------------------------------------------------------------------------+

     1.    RUN NAME        KOU1
     2.    TASK NAME       KOWARERU
     3.    # OF STIMULI    11
     4.    PRINT DATA      YES
     5.    PARAMETERS      DATA TYPE(1),MINKOWSKI(1.0)
     6.    DIMENSION       2 TO 5
     7.    INPUT FORMAT    (10F5.0)
     8.    READ MATRIX

ROW  2  0.3850E+02

ROW  3  0.3250E+02  0.2100E+02

ROW  4  0.1750E+02  0.3250E+02  0.8000E+01

ROW  5  0.4900E+02  0.1100E+02  0.3250E+02  0.3500E+02

ROW  6  0.5300E+02  0.1600E+02  0.1300E+02  0.2250E+02  0.1000E+02

ROW  7  0.1000E+01  0.4450E+02  0.3250E+02  0.1750E+02  0.5100E+02  0.5450E+02

ROW  8  0.2700E+02  0.2700E+02  0.6000E+01  0.9000E+01  0.2700E+02  0.1150E+02
        0.4450E+02

ROW  9  0.1200E+02  0.7000E+01  0.4050E+02  0.2700E+02  0.2700E+02  0.4450E+02
        0.1400E+02  0.3650E+02

ROW 10  0.3000E+01  0.3150E+02  0.4450E+02  0.3650E+02  0.5200E+02  0.5450E+02
        0.2000E+01  0.4450E+02  0.1500E+02

ROW 11  0.2700E+02  0.5000E+01  0.4450E+02  0.5000E+02  0.1950E+02  0.4050E+02
        0.2700E+02  0.4800E+02  0.4000E+01  0.2250E+02

  10 ROWS ARE READ.
     9.    COMPUTE
```

```
10U1                                                              KOWARERU
 SOLUTION IN  3 DIMENSIONS:
 *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

 FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM  DESCRIPTION)

 RAW STRESS DHAT      =       0.021220
 STRESS DHAT          =       0.013243
 RAW STRESS DSTAR     =       0.043824
 COEF. ALIEN. DSTAR   =       0.019030

 STRESS1 BASED ON APPROXIMATION TO RANDOM DATA  (SPENCE,MBR 1979 V14) =      0.138224

 OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION   2
 OPTIMAL SOLUTION USING DHAT  WAS REACHED AFTER ITERATION 102


 F I N A L   C O N F I G U R A T I O N
     1      0.9318      0.1665     -0.2651
     2     -0.2144     -0.7095      0.3345
     3     -0.4127      0.8204      0.2116
     4     -0.1254      0.8681      0.0824
     5     -0.8267     -0.3120     -0.7021
     6     -1.1965     -0.1076     -0.3406
     7      0.9941      0.1849     -0.1605
     8     -0.3606      0.7856      0.4355
     9      0.1295     -0.6394      0.3799
    10      1.0890     -0.0601     -0.2745
    11     -0.0081     -0.9469      0.3019
OMEAN   0.0000      0.0000      0.0000
OSIGMA  0.7094      0.6100      0.3530


 OU1                                                              KOWARERU

  DISTANCES

   7  1  0.1257   10  7  0.2864   10  1  0.2759   11  9  0.3023   11  2  0.3161
   8  3  0.2325    9  2  0.3475    4  3  0.3166    8  4  0.4321    6  5  0.5561
   5  2  1.2678    9  1  1.3402    6  3  1.3343    9  7  1.3431   10  9  1.3209
   6  2  1.3351    4  1  1.3163    7  4  1.3339   11  5  1.4426    8  6  1.4487
   3  2  1.5476    6  4  1.5093   11 10  1.5239    9  5  1.4925    8  2  1.5056
  11  1  1.5646   11  7  1.5809    8  1  1.5964    9  4  1.6060    8  5  1.6490
   5  3  1.5127    3  1  1.5701    7  3  1.5879    4  2  1.6001    5  4  1.5811
   9  8  1.5552   10  4  1.5696    2  1  1.5634   10  2  1.5784   11  6  1.5904
   9  3  1.6130    7  2  1.5829    8  7  1.5973    9  6  1.6174   10  3  1.8073
  11  3  1.8152   10  8  1.8222   11  8  1.7730    5  1  1.8733   11  4  1.8320
   7  5  1.9636   10  5  1.9789    6  1  2.1470    7  6  2.2173   10  6  2.2569
```

666

2

667

OU1 KOWARERU 3

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1257	10	7	0.2811	10	1	0.2811	11	9	0.2836	11	2	0.2836
8	3	0.2836	9	2	0.3331	4	3	0.3331	8	4	0.4321	6	5	0.5561
5	2	1.2678	9	1	1.3316	6	3	1.3316	9	7	1.3316	10	9	1.3316
6	2	1.3316	4	1	1.3316	7	4	1.3339	11	5	1.4426	8	6	1.4407
3	2	1.5158	6	4	1.5158	11	10	1.5158	9	5	1.5158	8	2	1.5158
11	1	1.5646	11	7	1.5808	8	1	1.5808	9	4	1.5808	8	5	1.5808
5	3	1.5808	3	1	1.5808	7	3	1.5808	4	2	1.5808	5	4	1.5808
9	8	1.5808	10	4	1.5808	2	1	1.5808	10	2	1.5808	11	6	1.5904
9	3	1.5977	7	2	1.5977	8	7	1.5977	9	6	1.6174	10	3	1.8044
11	3	1.8044	10	8	1.8044	11	8	1.8044	5	1	1.8527	11	4	1.8527
7	5	1.9636	10	5	1.9789	6	1	2.1470	7	6	2.2174	10	6	2.2869

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

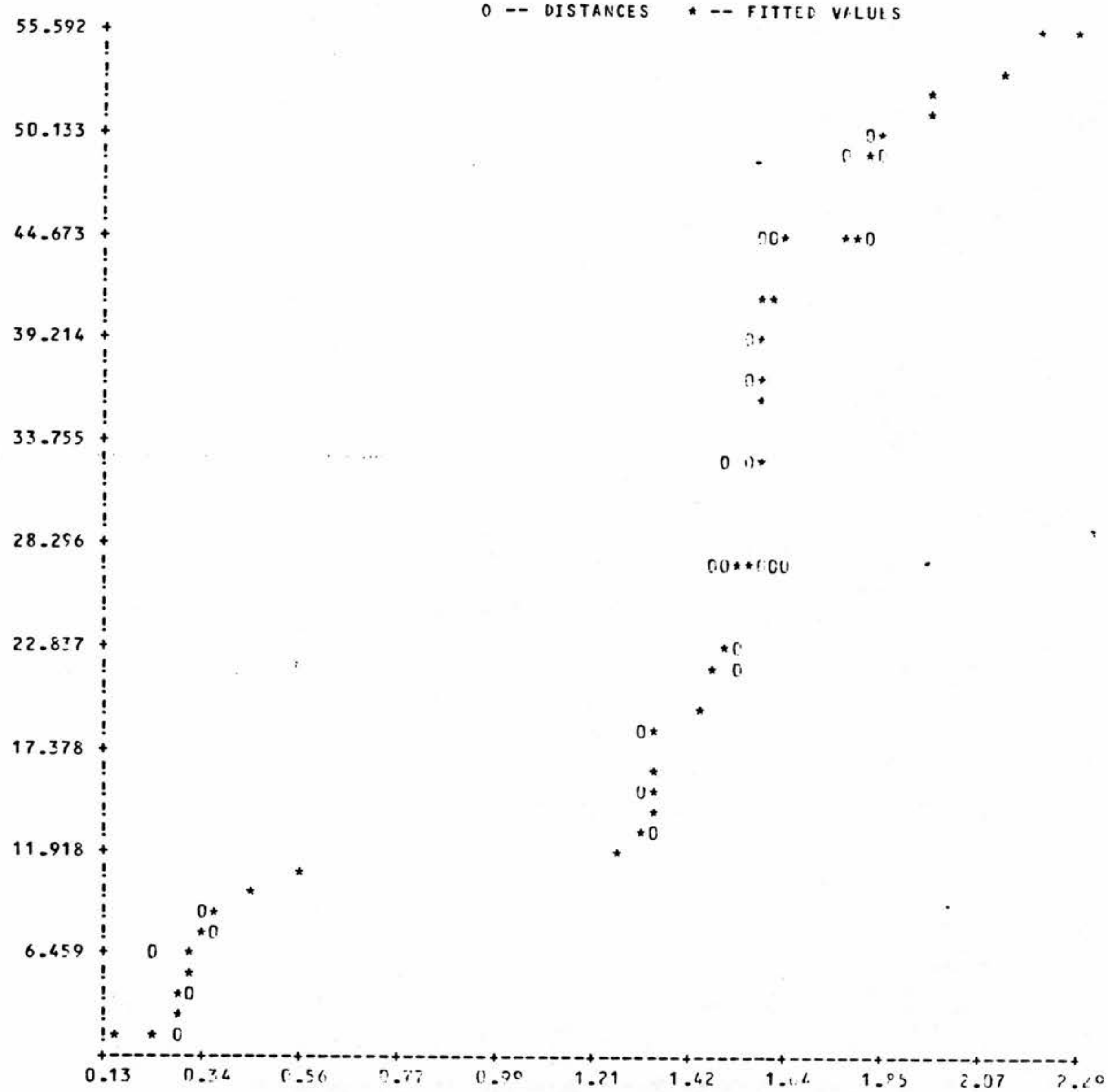
7	1	0.1257	10	7	0.2325	10	1	0.2759	11	9	0.2864	11	2	0.3023
8	3	0.3161	9	2	0.3186	4	3	0.3476	8	4	0.4321	6	5	0.5561
5	2	1.2678	9	1	1.3163	6	3	1.3209	9	7	1.3339	10	9	1.3343
6	2	1.3351	4	1	1.3402	7	4	1.3431	11	5	1.4426	8	6	1.4487
3	2	1.4925	6	4	1.5056	11	10	1.5093	9	5	1.5127	8	2	1.5239
11	1	1.5476	11	7	1.5552	8	1	1.5634	9	4	1.5646	8	5	1.5696
5	3	1.5701	3	1	1.5784	7	3	1.5809	4	2	1.5811	5	4	1.5829
9	8	1.5879	10	4	1.5904	2	1	1.5964	10	2	1.5975	11	6	1.6001
9	3	1.6060	7	2	1.6132	8	7	1.6174	9	6	1.6480	10	3	1.7733
11	3	1.8073	10	8	1.8152	11	8	1.8222	5	1	1.8320	11	4	1.8733
7	5	1.9636	10	5	1.9789	6	1	2.1470	7	6	2.2174	10	6	2.2869

4

OU1

KOWARERU

SIMILARITY



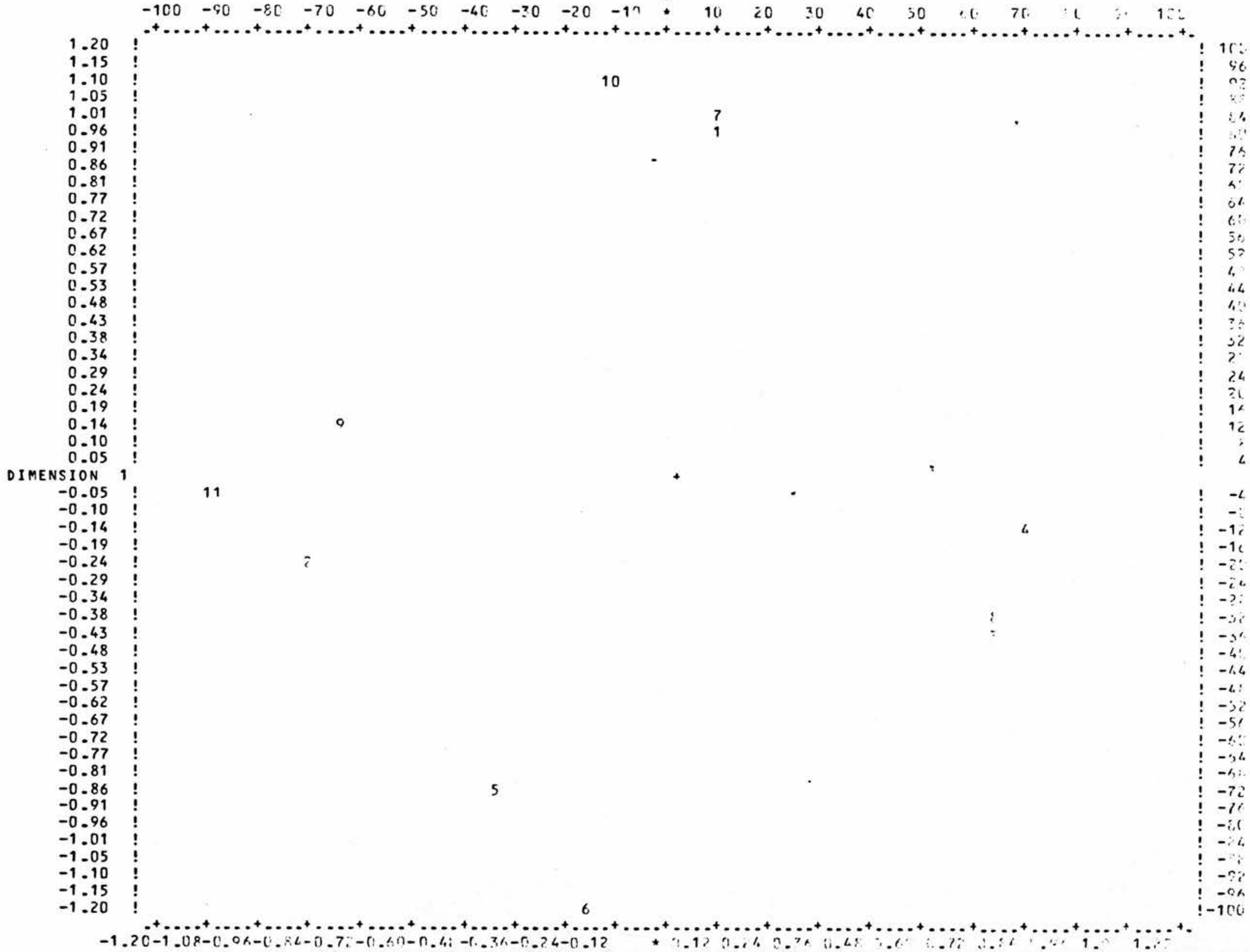
10U1

KOWARERU

5

FINAL CONFIGURATION

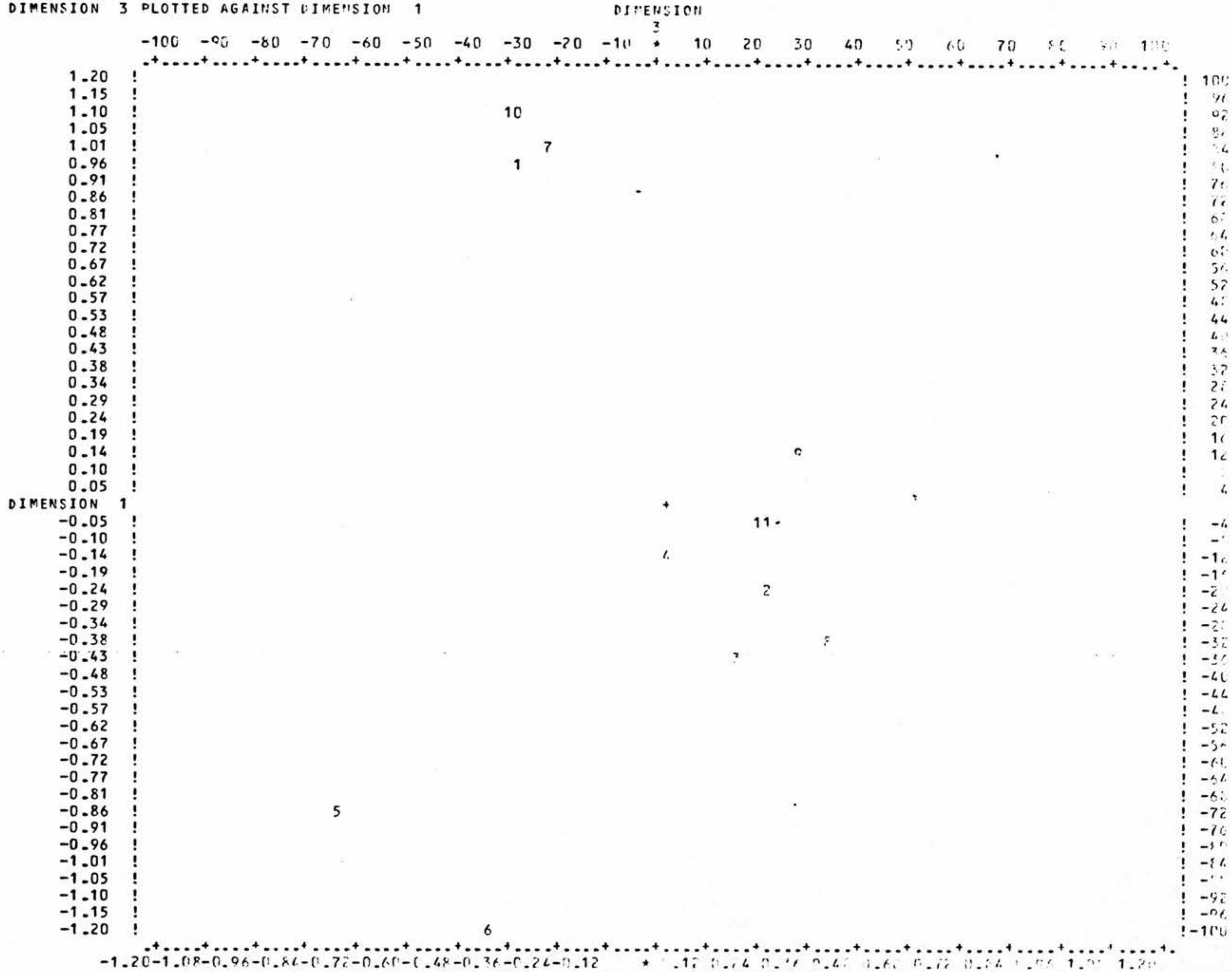
DIMENSION 2 PLOTTED AGAINST DIMENSION 1



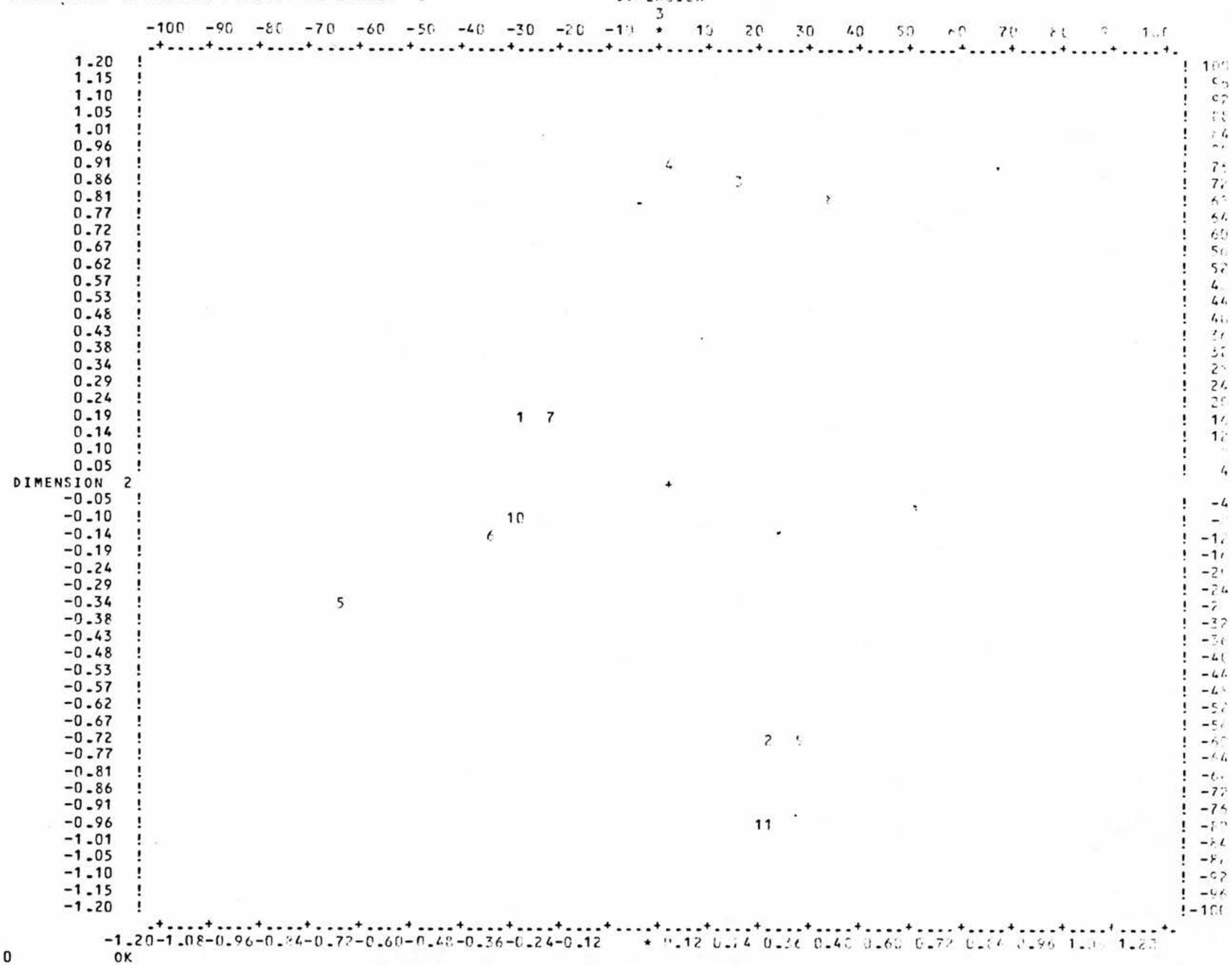
669

6

FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 1



FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 2



0 OK
10U1

8

```
SOLUTION IN  2 DIMENSIONS:
 *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM  DESCRIPTION)

RAW STRESS DHAT       =     0.168977
STRESS DHAT           =     0.037370
RAW STRESS DSTAR      =     0.403852
COEF. ALIEN. DSTAR    =     0.057749


STRESS1 BASED ON APPROXIMATION TO RANDOM DATA  (SPENCE,MBR 1979 V14) =      0.170667

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION   3
OPTIMAL SOLUTION USING DHAT  WAS REACHED AFTER ITERATION  14


F I N A L   C O N F I G U R A T I O N
    1     0.9754      0.1563
    2    -0.2539     -0.7065
    3    -0.4189      0.7651
    4    -0.0511      0.8791
    5    -1.1015     -0.4220
    6    -1.2572      0.0138
    7     1.0450      0.1623
    8    -0.3458      0.9082
    9     0.1974     -0.6665
   10     1.1880     -0.0972
   11     0.0227     -0.9925
OMEAN    0.0000      0.0000
OSIGMA   0.7775      0.6228


OU1                                                                KCWAREFU

 DISTANCES

  7  1  0.0699   10  7  0.2962   10  1  0.3308   11  9  0.3692   11  2  0.3979
  8  3  0.1607    9  2  0.4531    4  3  0.3851    8  4  0.2961    6  5  0.4628
  5  2  0.8941    9  1  1.1324    6  3  1.1257    9  7  1.1855   10  9  1.1426
  6  2  1.2351    4  1  1.2554    7  4  1.3097   11  5  1.2607    8  6  1.2769
  3  2  1.4807   11 10  1.4695    6  4  1.4844    9  5  1.3217   11  1  1.4924
  8  1  1.5201    8  5  1.5292   11  7  1.5423    9  4  1.5654    8  2  1.6172
  5  3  1.3694    3  1  1.5213    7  3  1.5631    4  2  1.5935    5  4  1.6722
 10  4  1.5774    9  8  1.6657    2  1  1.5018   10  2  1.5653    9  3  1.5586
 11  6  1.6282    7  2  1.5626    6  7  1.5782    9  6  1.6058   11  3  1.8122
 10  3  1.8236   10  8  1.8339   11  8  1.9361    5  1  2.1552   11  4  1.8730
  7  5  2.2246   10  5  2.3124    6  1  2.2371    7  6  2.3070   10  6  2.4477
```

673

OU1 KCWARERU

9

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

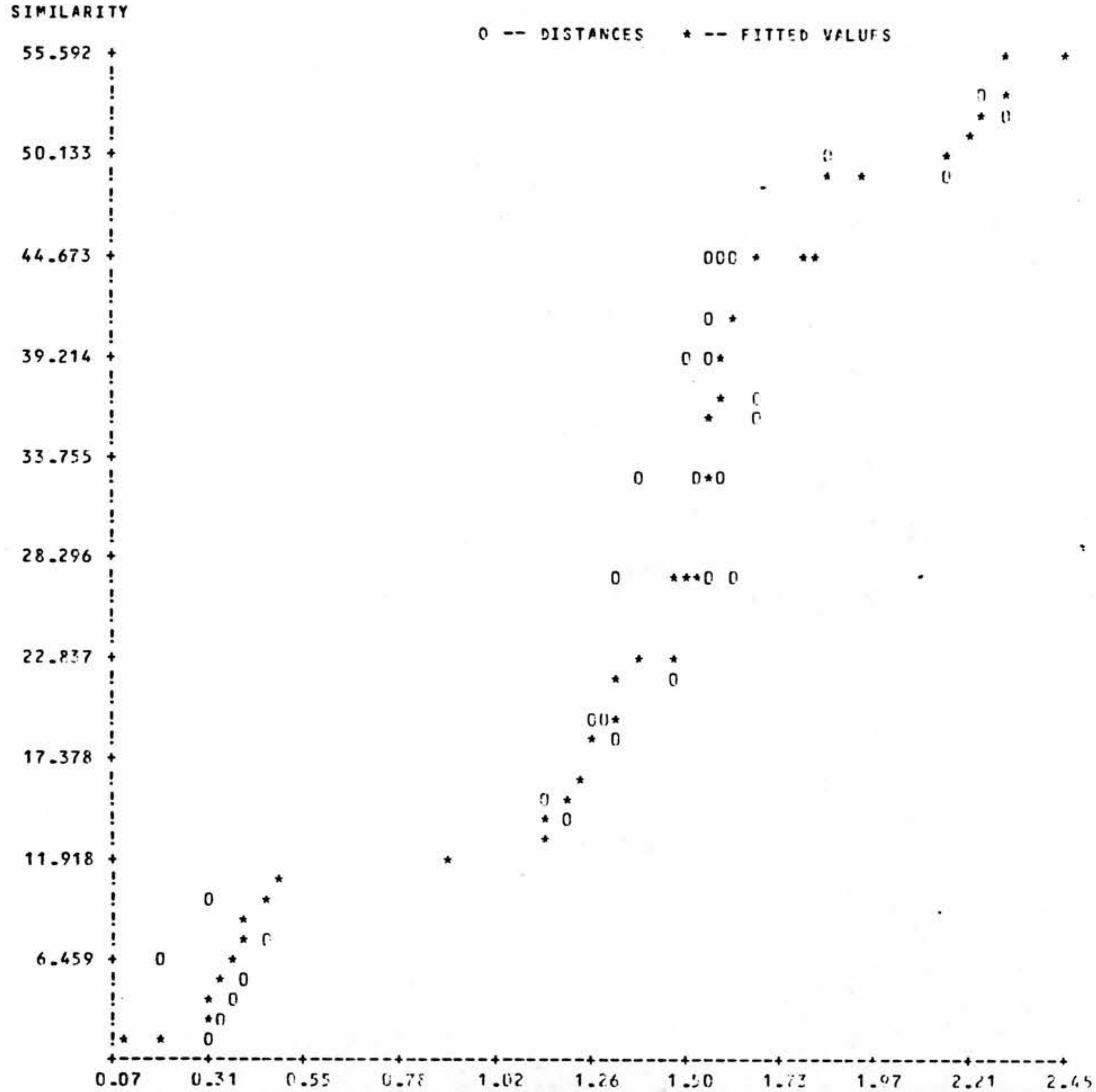
7	1	0.0699	10	7	0.2962	10	1	0.3148	11	9	0.3148	11	2	0.3148
8	3	0.3148	9	2	0.3781	4	3	0.3781	8	4	0.3781	6	5	0.4629
5	2	0.8941	9	1	1.1290	6	3	1.1290	9	7	1.1640	10	9	1.1640
6	2	1.2351	4	1	1.2554	7	4	1.2824	11	5	1.2824	8	6	1.2824
3	2	1.4391	11	10	1.4391	6	4	1.4391	9	5	1.4391	11	1	1.4924
8	1	1.5201	8	5	1.5243	11	7	1.5243	9	4	1.5243	8	2	1.5243
5	3	1.5243	3	1	1.5243	7	3	1.5831	4	2	1.5909	5	4	1.5909
10	4	1.5909	9	8	1.5909	2	1	1.5909	10	2	1.5909	9	3	1.5909
11	6	1.5909	7	2	1.5909	8	7	1.5909	9	6	1.6053	11	3	1.8122
10	3	1.8236	10	8	1.8339	11	8	1.9361	5	1	2.0145	11	4	2.0145
7	5	2.2246	10	5	2.2748	6	1	2.2748	7	6	2.3070	10	6	2.4477

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0699	10	7	0.1607	10	1	0.2961	11	9	0.2962	11	2	0.3308
8	3	0.3699	9	2	0.3851	4	3	0.3979	8	4	0.4531	6	5	0.4629
5	2	0.8941	9	1	1.1257	6	3	1.1324	9	7	1.1426	10	9	1.1855
6	2	1.2351	4	1	1.2554	7	4	1.2607	11	5	1.2769	8	6	1.3097
3	2	1.3217	11	10	1.3694	6	4	1.4095	9	5	1.4807	11	1	1.4844
8	1	1.4924	8	5	1.5015	11	7	1.5201	9	4	1.5213	8	2	1.5299
5	3	1.5423	3	1	1.5586	7	3	1.5626	4	2	1.5653	5	4	1.5654
10	4	1.5774	9	8	1.5782	2	1	1.5831	10	2	1.5985	9	3	[illegible]
11	6	1.6172	7	2	1.6282	8	7	1.6657	9	6	1.6722	11	3	1.8122
10	3	1.8236	10	8	1.8339	11	8	1.8730	5	1	1.9361	11	4	2.1559
7	5	2.2246	10	5	2.2371	6	1	2.3070	7	6	2.3124	10	6	2.4477

OU1

KOWARERU



674

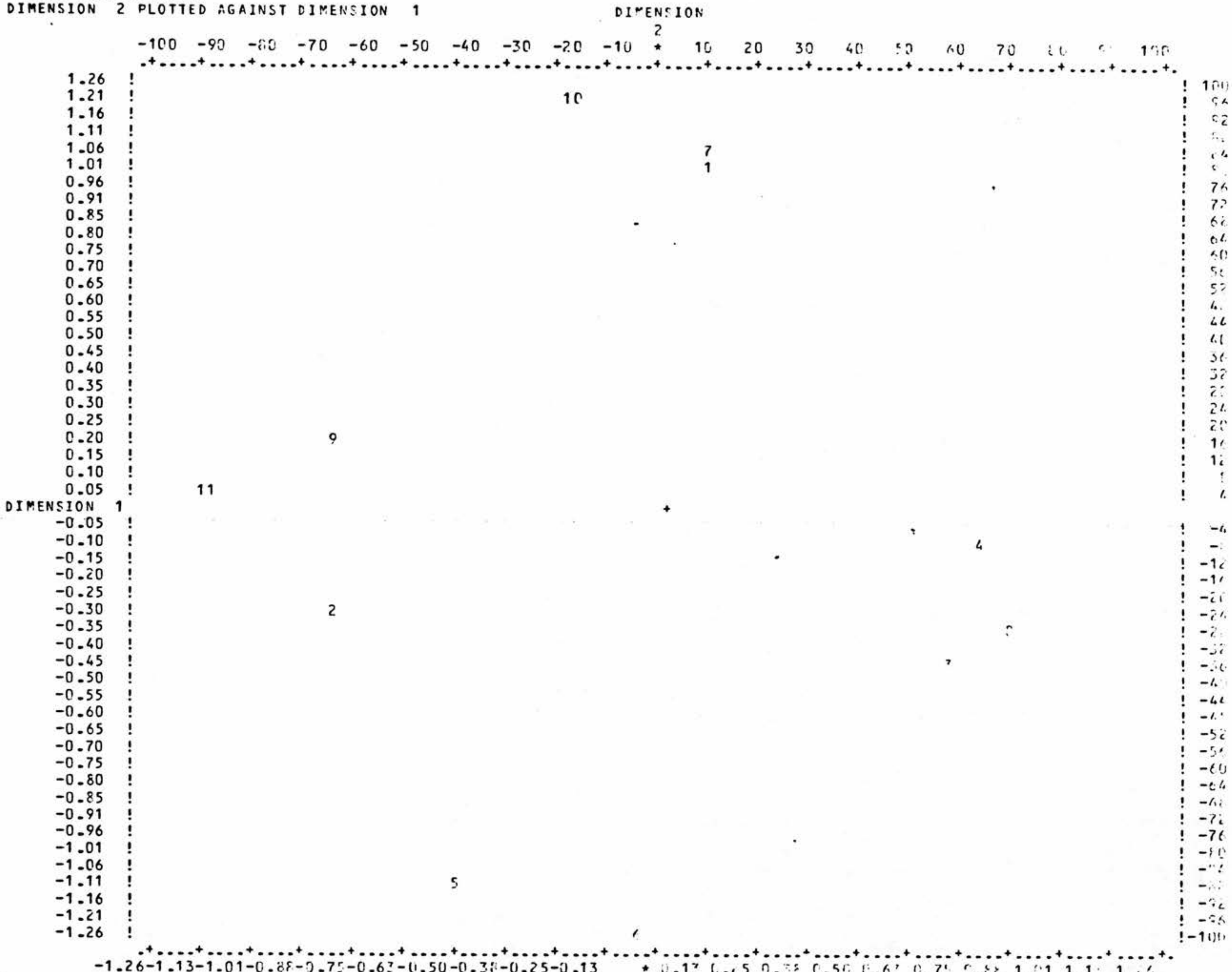
1001

FINAL CONFIGURATION

DIMENSION 2 PLOTTED AGAINST DIMENSION 1

KOWARERU

//



1

10. FINISH

675

```
+------------------------------------------------------------------------------+
|                                                                              |
|                        M  D  S  (X)  PROGRAMS                                |
|                                                                              |
|    AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND |
|    LANGUAGE.                                                                 |
|                                                                              |
|    PROGRAMS AND SUPPORTING DOCUMENTATION        OTHER ENQUIRIES SHOULD       |
|    ARE DISTRIBUTED FROM                         BE ADDRESSED TO              |
|                                                                              |
|    MDS(X) PROJECT,                              MDS(X) PROJECT,              |
|    PROGRAM LIBRARY UNIT,                        SOCIOLOGICAL RESEARCH UNIT,  |
|    UNIVERSITY OF EDINBURGH,                     UNIVERSITY COLLEGE,          |
|    18 BUCCLEUCH PLACE,                          P.O. BOX 78,                 |
|    EDINBURGH EH8 9LN,                           CARDIFF CF1 1XL,             |
|    U.K.                                         U.K.                         |
|                                                                              |
|    USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN |
|    PUBLISHING RESULTS.                                                       |
|                                                                              |
+------------------------------------------------------------------------------+

      1.    RUN NAME        KCUN2
      2.    TASK NAME        KOWARERU
      3.    £ OF STIMULI     11
      4.    PRINT DATA       YES
      5.    PARAMETERS       DATA TYPE(1) MINKOWSKI(1.0)
      6.    DIMENSION         2 TO 5
      7.    INPUT FORMAT     (10F5.0)
      8.    READ MATRIX

ROW   2  0.3900E+02

ROW   3  0.3300E+02  0.2700E+02

ROW   4  0.1700E+02  0.2600E+02  0.1000E+02

ROW   5  0.5000E+02  0.1100E+02  0.2400E+02  0.3700E+02

ROW   6  0.5100E+02  0.1500E+02  0.1400E+02  0.2800E+02  0.8000E+01

ROW   7  0.1000E+01  0.4350E+02  0.2900E+02  0.2000E+02  0.5250E+02  0.5500E+02

ROW   8  0.3400E+02  0.3000E+02  0.7000E+01  0.9000E+01  0.2500E+02  0.1900E+02
         0.4100E+02

ROW   9  0.1200E+02  0.6000E+01  0.3500E+02  0.3200E+02  0.2200E+02  0.4800E+02
         0.1300E+02  0.3600E+02

ROW  10  0.3000E+01  0.3800E+02  0.4000E+02  0.4700E+02  0.5250E+02  0.5400E+02
         0.4000E+01  0.4500E+02  0.1800E+02

ROW  11  0.2300E+02  0.5000E+01  0.4600E+02  0.4900E+02  0.1600E+02  0.4200E+02
         0.3100E+02  0.4350E+02  0.2000E+01  0.2100E+02

   10 ROWS ARE READ.
         9.    COMPUTE
```

2

```
U           OK
1OUN2                                                                     KOWARERU

 SOLUTION IN  3 DIMENSIONS:
  *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *

 FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM  DESCRIPTION)

 RAW STRESS DHAT      =      0.001070
 STRESS DHAT          =      0.002974
 RAW STRESS DSTAR     =      0.003209
 COEF. ALIEN. DSTAR   =      0.005150


 STRESS1 BASED ON APPROXIMATION TO RANDOM DATA  (SPENCE,MBR 1979 V14) =      0.138224

 OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION  97
 OPTIMAL SOLUTION USING DHAT  WAS REACHED AFTER ITERATION 197


 F I N A L   C O N F I G U R A T I O N
     1     1.1220      0.0203     -0.0040
     2    -0.1787     -0.7085      0.0632
     3    -0.1361      0.7441     -0.1291
     4    -0.1003      0.7271      0.2472
     5    -1.3372     -0.0676     -0.0190
     6    -1.3544      0.0407     -0.1157
     7     1.1400      0.0130     -0.0030
     8    -0.1447      0.7575      0.0180
     9    -0.0566     -0.7322      0.0996
    10     1.1461     -0.0292     -0.1309
    11    -0.1000     -0.7652     -0.0264
OMEAN    0.0000      0.0000      0.0000
OSIGMA   0.8306      0.5467      0.1060


 OUN2                                                                     KOWARERU

  DISTANCES

   7  1  0.0195   11  9  0.1373   10  1  0.1383   10  7  0.1347   11  2  0.1321
   9  2  0.1296    8  3  0.1479    6  5  0.1461    8  4  0.2354    4  3  0.3783
   5  2  1.3266    9  1  1.4022    9  7  1.4134    6  3  1.4068    6  2  1.4055
  11  5  1.4204    4  1  1.4341   10  9  1.4121    8  6  1.4124    7  4  1.4529
  11 10  1.4510    9  5  1.4477   11  1  1.4528    5  3  1.4538    8  5  1.4506
   4  2  1.4494    3  2  1.4659    6  4  1.4749    7  3  1.4761    8  2  1.4670
  11  7  1.4641    9  4  1.4674    3  1  1.4568    8  1  1.4657    9  3  1.4960
   9  8  1.4945    5  4  1.4941   10  2  1.5014    2  1  1.4924   10  3  1.4974
   8  7  1.4850   11  6  1.4936    7  2  1.5046   11  8  1.5239   10  8  1.5189
  11  3  1.5132   10  4  1.5061    9  6  1.5257   11  4  1.5171    5  1  2.4608
   6  1  2.4739    7  5  2.4786   10  5  2.4862   10  6  2.5015    7  6  2.4971
```

677

678

OUN2 KOWARERU

3

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0195	11	9	0.1344	10	1	0.1344	10	7	0.1344	11	2	0.1344
9	2	0.1344	8	3	0.1470	6	5	0.1470	8	4	0.2354	4	3	0.3783
5	2	1.3266	9	1	1.4022	9	7	1.4086	6	3	1.4086	6	2	1.4086
11	5	1.4197	4	1	1.4197	10	9	1.4197	8	6	1.4197	7	4	1.4505
11	10	1.4505	9	5	1.4505	11	1	1.4516	5	3	1.4516	8	5	1.4516
4	2	1.4516	3	2	1.465[illegible]	6	4	1.4674	7	3	1.4674	8	2	1.4674
11	7	1.4674	9	4	1.4674	3	1	1.4674	8	1	1.4674	9	3	1.4943
9	8	1.4943	5	4	1.4943	10	2	1.4943	2	1	1.4943	10	3	1.4943
8	7	1.4943	11	6	1.4943	7	2	1.5046	11	8	1.5155	10	8	1.5155
11	3	1.5155	10	4	1.5155	9	6	1.5214	11	4	1.5214	5	1	2.4608
6	1	2.4788	7	5	2.4788	10	5	2.4862	10	6	2.4993	7	6	2.4993

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

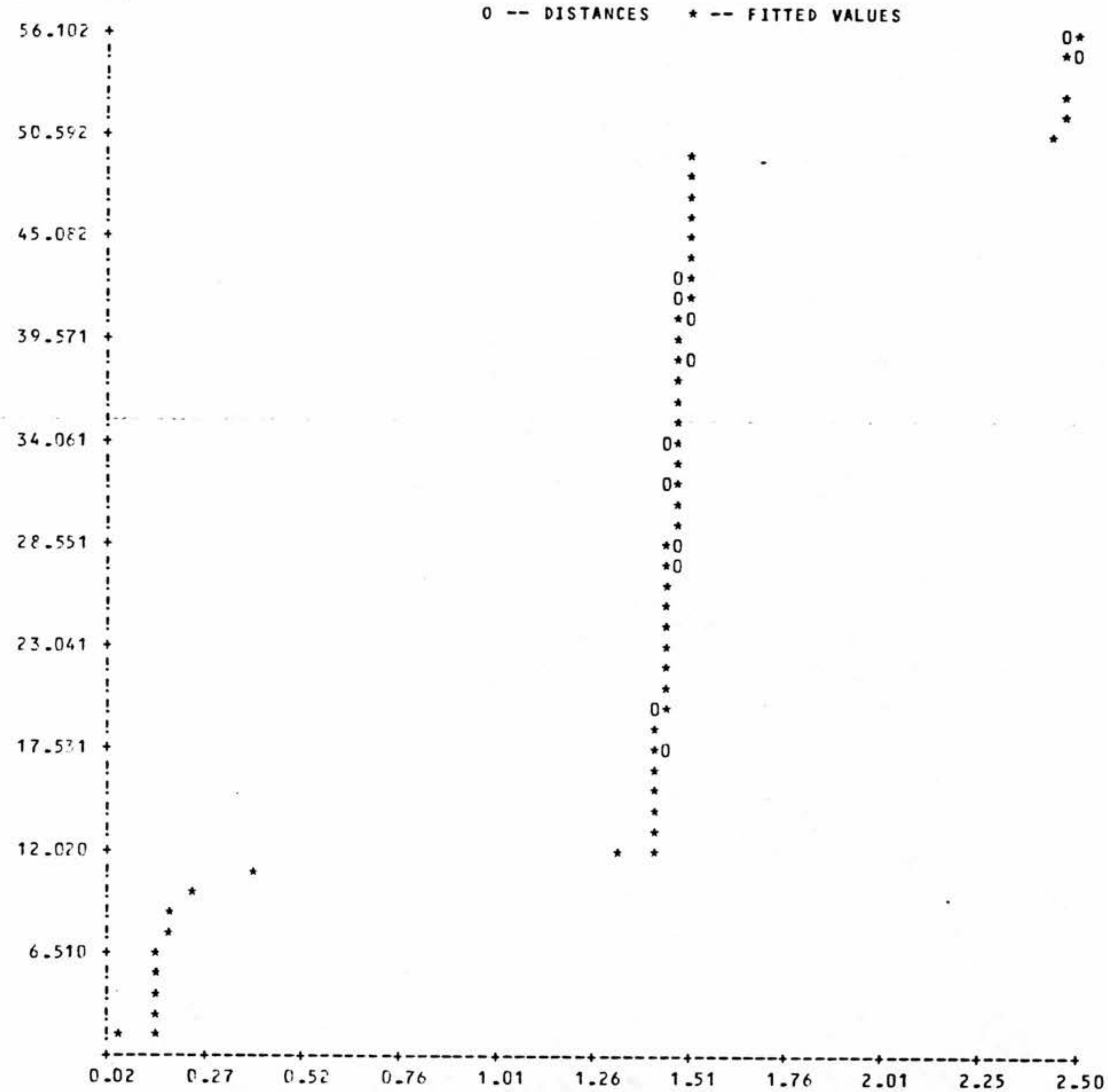
7	1	0.0195	11	9	0.1296	10	1	0.1321	10	7	0.1347	11	2	0.1373
9	2	0.1383	8	3	0.1461	6	5	0.1479	8	4	0.2354	4	3	0.3783
5	2	1.3266	9	1	1.4022	9	7	1.4055	6	3	1.4068	6	2	1.4121
11	5	1.4124	4	1	1.4134	10	9	1.4204	8	6	1.4341	7	4	1.4477
11	10	1.4494	9	5	1.4506	11	1	1.4510	5	3	1.4528	8	5	1.4529
4	2	1.4538	3	2	1.4568	6	4	1.4641	7	3	1.4657	8	2	1.4658
11	7	1.4670	9	4	1.4674	3	1	1.4749	8	1	1.4761	9	3	1.4850
9	8	1.4924	5	4	1.4936	10	2	1.4941	2	1	1.4945	10	3	1.4960
8	7	1.4974	11	6	1.5014	7	2	1.5046	11	8	1.5061	10	8	1.5132
11	3	1.5171	10	4	1.5189	9	6	1.5239	11	4	1.5257	5	1	2.4608
6	1	2.4786	7	5	2.478[illegible]	10	5	2.4862	10	6	2.4971	7	6	2.5015

===============

OUN2.

KOWARERU

SIMILARITY



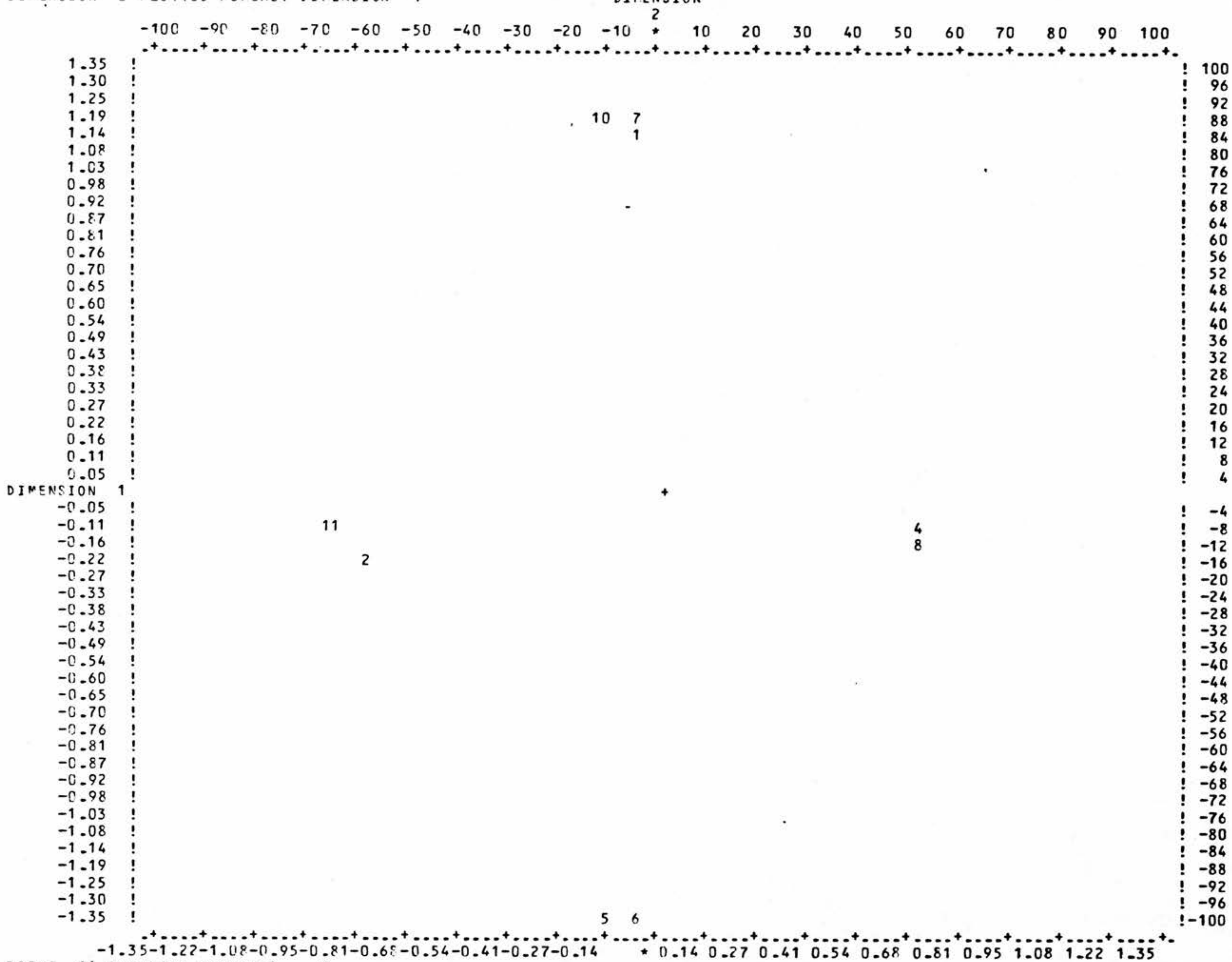
4

679

1OUN2
FINAL CONFIGURATION
DIMENSION 2 PLOTTED AGAINST DIMENSION 1

KOWARERU

5

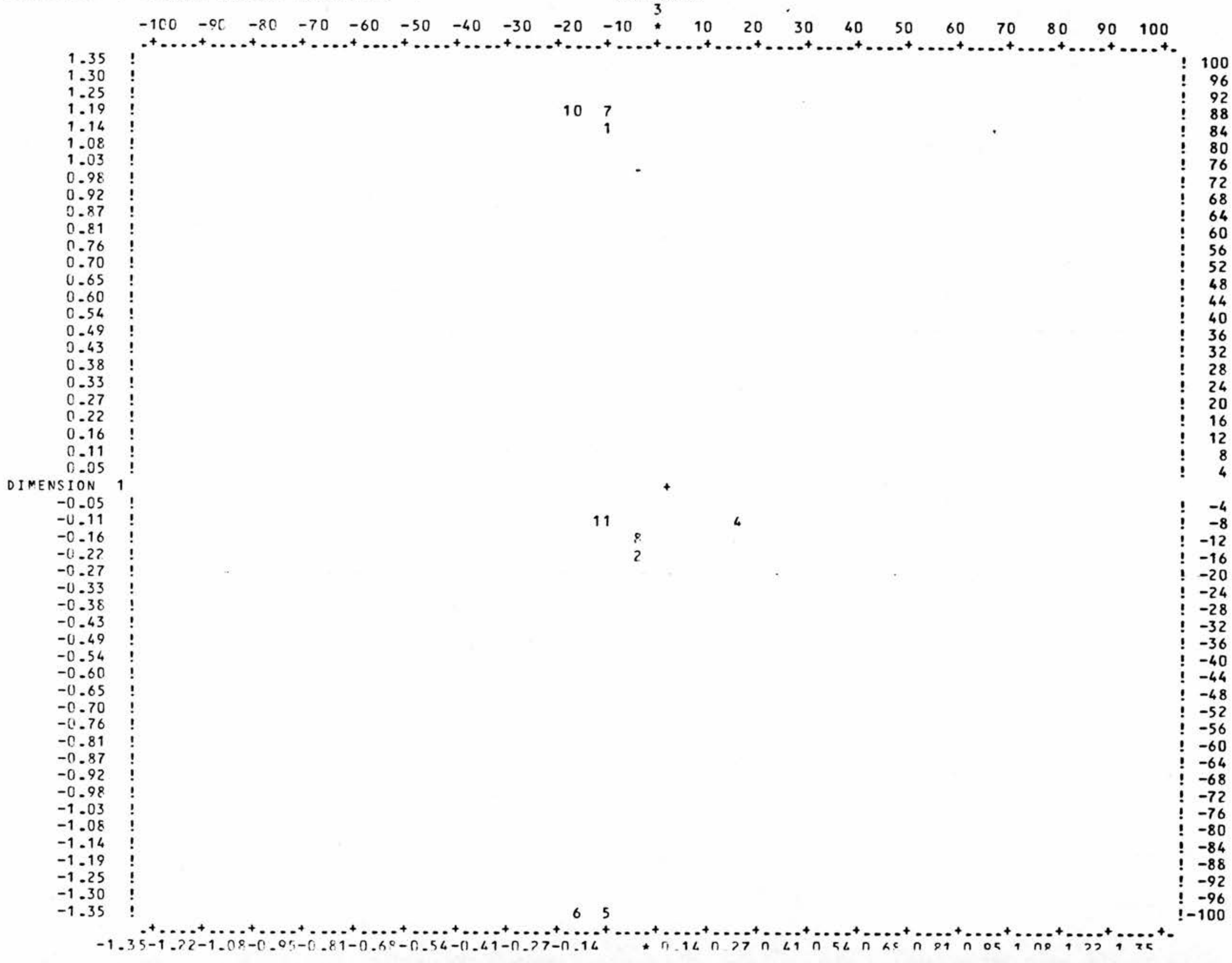


POINT 11 OVERLAYS POINT(S) 9
POINT 8 OVERLAYS POINT(S) 3

680

1OUN2
FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 1

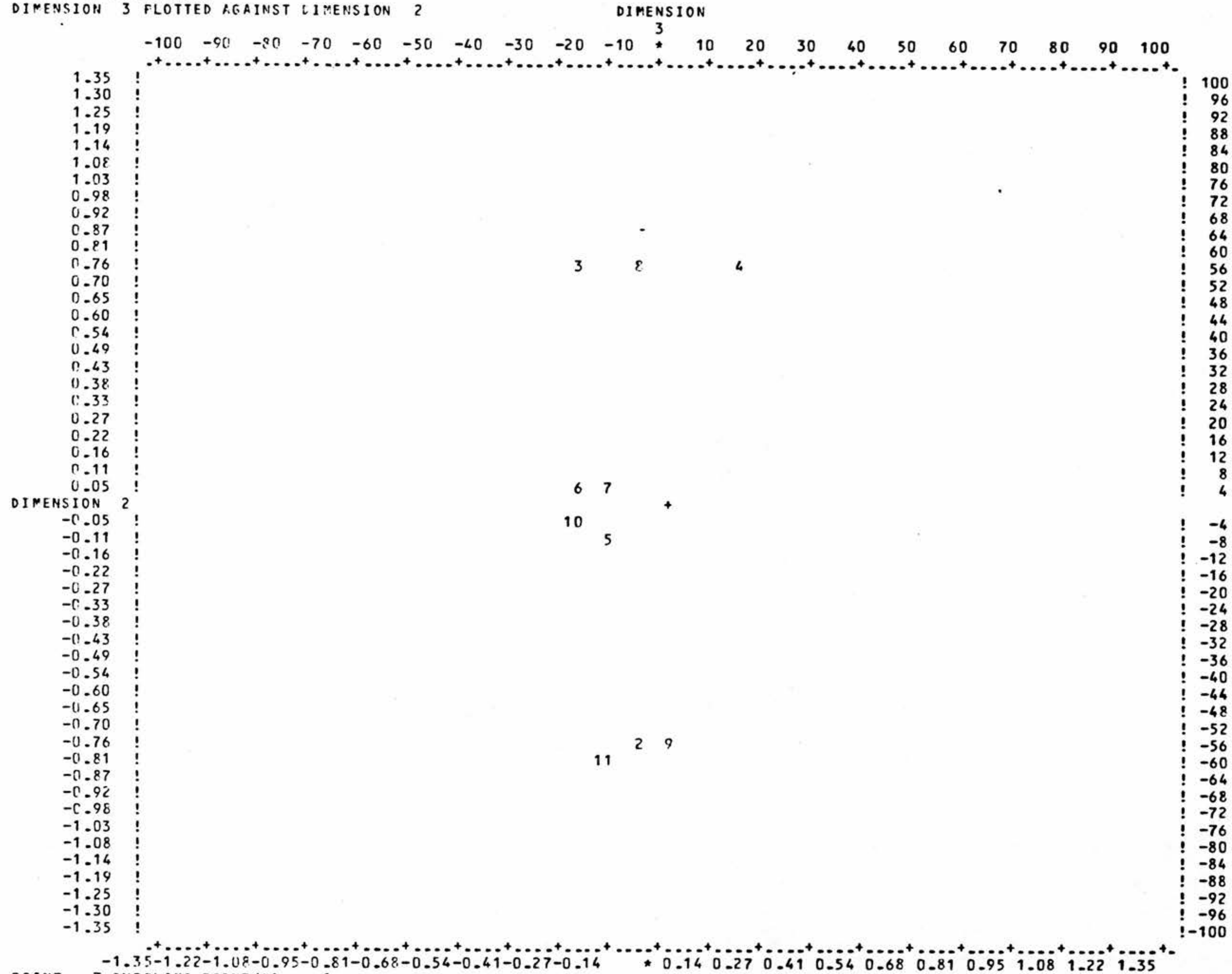
KOWARERU



681

7

FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 2



POINT 7 OVERLAYS POINT(S) 1
0 OK

8

```
SOLUTION IN  2 DIMENSIONS:
 *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

FIT= DSTAR; ALGORITHM= SOFT SQUEEZE; (SEE PROGRAM  DESCRIPTION)

RAW STRESS DHAT      =      0.000000
STRESS DHAT          =      0.000004
RAW STRESS DSTAR     =      0.000000
COEF. ALIEN. DSTAR   =      0.000005

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA  (SPENCE,MBR 1979 V14) =     0.170667

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION  89
OPTIMAL SOLUTION USING DHAT  WAS REACHED AFTER ITERATION  89


F I N A L   C O N F I G U R A T I O N
     1     1.1471      0.0000
     2    -0.1147     -0.7285
     3    -0.1147      0.7285
     4    -0.1147      0.7285
     5    -1.3765      0.0000
     6    -1.3765      0.0000
     7     1.1471      0.0000
     8    -0.1147      0.7285
     9    -0.1147     -0.7285
    10     1.1471      0.0000
    11    -0.1147     -0.7285
OMEAN    0.0000      0.0000
OSIGMA   0.8429      0.5380


OUN2                                                              KOWARERU

 DISTANCES

   7  1  0.0000   11  9  0.0000   10  1  0.0000   10  7  0.0000   11  2  0.0000
   9  2  0.0000    8  3  0.0000    6  5  0.0000    8  4  0.0000    4  3  0.0000
   5  2  1.4569    9  1  1.4570    9  7  1.4570    6  3  1.4570    6  2  1.4570
  11  5  1.4570    4  1  1.4570   10  9  1.4570    8  6  1.4570    7  4  1.4570
  11 10  1.4570    9  5  1.4570   11  1  1.4570    5  3  1.4570    8  5  1.4570
   4  2  1.4570    3  2  1.4570    6  4  1.4570    7  3  1.4570    8  2  1.4570
  11  7  1.4570    9  4  1.4570    3  1  1.4570    8  1  1.4570    9  3  1.4570
   9  8  1.4570    5  4  1.4570   10  2  1.4570    2  1  1.4570   10  3  1.4570
   8  7  1.4570   11  6  1.4570    7  2  1.4570   11  8  1.4570   10  8  1.4570
  11  3  1.4570   10  4  1.4570    9  6  1.4570   11  4  1.4570    5  1  2.5235
   6  1  2.5236    7  5  2.5236   10  5  2.5236   10  6  2.5236    7  6  2.5236
```

683

684

OUN2 KOWARERU

9

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0000	11	9	0.0000	10	1	0.0000	10	7	0.0000	11	2	0.0000
9	2	0.0000	8	3	0.0000	6	5	0.0000	8	4	0.0000	4	3	0.0000
5	2	1.4569	9	1	1.4570	9	7	1.4570	6	3	1.4570	6	2	1.4570
11	5	1.4570	4	1	1.4570	10	9	1.4570	8	6	1.4570	7	4	1.4570
11	10	1.4570	9	5	1.4570	11	1	1.4570	5	3	1.4570	8	5	1.4570
4	2	1.4570	3	2	1.4570	6	4	1.4570	7	3	1.4570	8	2	1.4570
11	7	1.4570	9	4	1.4570	3	1	1.4570	8	1	1.4570	9	3	1.4570
9	8	1.4570	5	4	1.4570	10	2	1.4570	2	1	1.4570	10	3	1.4570
8	7	1.4570	11	6	1.4570	7	2	1.4570	11	8	1.4570	10	8	1.4570
11	3	1.4570	10	4	1.4570	9	6	1.4570	11	4	1.4570	5	1	2.5235
6	1	2.5236	7	5	2.5236	10	5	2.5236	10	6	2.5236	7	6	2.5236

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0000	11	9	0.0000	10	1	0.0000	10	7	0.0000	11	2	0.0000
9	2	0.0000	8	3	0.0000	6	5	0.0000	8	4	0.0000	4	3	0.0000
5	2	1.4569	9	1	1.4570	9	7	1.4570	6	3	1.4570	6	2	1.4570
11	5	1.4570	4	1	1.4570	10	9	1.4570	8	6	1.4570	7	4	1.4570
11	10	1.4570	9	5	1.4570	11	1	1.4570	5	3	1.4570	8	5	1.4570
4	2	1.4570	3	2	1.4570	6	4	1.4570	7	3	1.4570	8	2	1.4570
11	7	1.4570	9	4	1.4570	3	1	1.4570	8	1	1.4570	9	3	1.4570
9	8	1.4570	5	4	1.4570	10	2	1.4570	2	1	1.4570	10	3	1.4570
8	7	1.4570	11	6	1.4570	7	2	1.4570	11	8	1.4570	10	8	1.4570
11	3	1.4570	10	4	1.4570	9	6	1.4570	11	4	1.4570	5	1	2.5235
6	1	2.5236	7	5	2.5236	10	5	2.5236	10	6	2.5236	7	6	2.5236

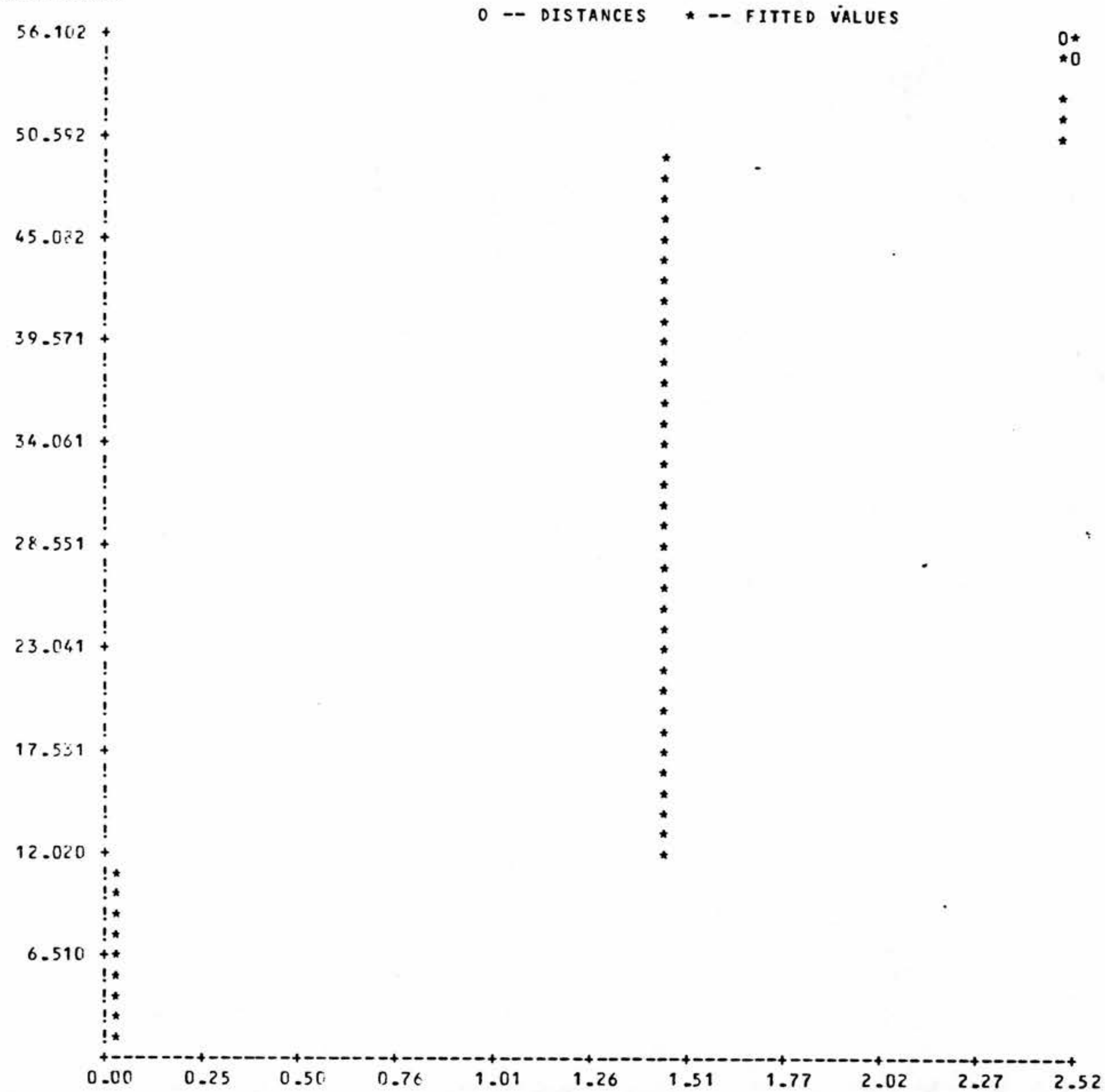
10

===============

OUN2

KOWARERU

SIMILARITY



685

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                                                    2
              -100  -90  -80  -70  -60  -50  -40  -30  -20  -10   *   10   20   30   40   50   60   70   80   90  100
               .+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+.
       1.38   !                                                                                                       !  100
       1.32   !                                                                                                       !   96
       1.27   !                                                                                                       !   92
       1.21   !                                                                                                       !   88
       1.16   !                                              10  7                                                    !   84
       1.10   !                                                                                                       !   80
       1.05   !                                                                                                       !   76
       0.99   !                                                                                                       !   72
       0.94   !                                                                                                       !   68
       0.88   !                                                                                                       !   64
       0.83   !                                                                                                       !   60
       0.77   !                                                                                                       !   56
       0.72   !                                                                                                       !   52
       0.66   !                                                                                                       !   48
       0.61   !                                                                                                       !   44
       0.55   !                                                                                                       !   40
       0.50   !                                                                                                       !   36
       0.44   !                                                                                                       !   32
       0.39   !                                                                                                       !   28
       0.33   !                                                                                                       !   24
       0.28   !                                                                                                       !   20
       0.22   !                                                                                                       !   16
       0.17   !                                                                                                       !   12
       0.11   !                                                                                                       !    8
       0.06   !                                                                                                       !    4
 DIMENSION  1                                                    +
      -0.06   !                                                                                                       !   -4
      -0.11   !                                                                                                       !   -8
      -0.17   !                   11                                                        8                         !  -12
      -0.22   !                                                                                                       !  -16
      -0.28   !                                                                                                       !  -20
      -0.33   !                                                                                                       !  -24
      -0.39   !                                                                                                       !  -28
      -0.44   !                                                                                                       !  -32
      -0.50   !                                                                                                       !  -36
      -0.55   !                                                                                                       !  -40
      -0.61   !                                                                                                       !  -44
      -0.66   !                                                                                                       !  -48
      -0.72   !                                                                                                       !  -52
      -0.77   !                                                                                                       !  -56
      -0.83   !                                                                                                       !  -60
      -0.88   !                                                                                                       !  -64
      -0.94   !                                                                                                       !  -68
      -0.99   !                                                                                                       !  -72
      -1.05   !                                                                                                       !  -76
      -1.10   !                                                                                                       !  -80
      -1.16   !                                                                                                       !  -84
      -1.21   !                                                                                                       !  -88
      -1.27   !                                                                                                       !  -92
      -1.32   !                                                                                                       !  -96
      -1.38   !                                              5  6                                                     ! -100
               .+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+.
           -1.38-1.24-1.10-0.96-0.83-0.69-0.55-0.41-0.28-0.14     * 0.14 0.28 0.41 0.55 0.69 0.83 0.96 1.10 1.24 1.38
 POINT   11 OVERLAYS POINT(S)     9   2
 POINT    8 OVERLAYS POINT(S)     4   3
 POINT    7 OVERLAYS POINT(S)     1
1
           10.      FINISH
```

```
+--------------------------------------------------------------------------------+
|                              M  D  S  (X)  PROGRAMS                            |
|                                                                                |
|   AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND
|   LANGUAGE.                                                                    |
|                                                                                |
|   PROGRAMS AND SUPPORTING DOCUMENTATION       OTHER ENQUIRIES SHOULD           |
|   ARE DISTRIBUTED FROM                        BE ADDRESSED TO                  |
|                                                                                |
|   MDS(X) PROJECT,                             MDS(X) PROJECT,                  |
|   PROGRAM LIBRARY UNIT,                       SOCIOLOGICAL RESEARCH UNIT,      |
|   UNIVERSITY OF EDINBURGH,                    UNIVERSITY COLLEGE,              |
|   18 BUCCLEUCH PLACE,                         P.O. BOX 78,                     |
|   EDINBURGH EH8 9LN,                          CARDIFF CF1 1XL,                 |
|   U.K.                                        U.K.                             |
|                                                                                |
|   USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN |
|   PUBLISHING RESULTS.                                                          |
+--------------------------------------------------------------------------------+

      1.   RUN NAME        KOC3
      2.   TASK NAME       KOWARERU
      3.   N OF STIMULI    11
      4.   PRINT DATA      YES
      5.   PARAMETERS      DATA(1)
      6.   DIMENSION       2 TO 5
      7.   INPUT FORMAT    (10F5.0)
      8.   READ MATRIX

ROW   2  0.2400E+02

ROW   3  0.1800E+02  0.2500E+02

ROW   4  0.2200E+02  0.1500E+02  0.9000E+01

ROW   5  0.5000E+02  0.6000E+01  0.2600E+02  0.2300E+02

ROW   6  0.5400E+02  0.2000E+02  0.1900E+02  0.2100E+02  0.1000E+02

ROW   7  0.1000E+01  0.4700E+02  0.3200E+02  0.2750E+02  0.3000E+02  0.5500E+02

ROW   8  0.4000E+02  0.3200E+02  0.5000E+01  0.1300E+02  0.3200E+02  0.1700E+02
         0.4300E+02

ROW   9  0.1400E+02  0.7000E+01  0.3400E+02  0.2750E+02  0.3800E+02  0.4100E+02
         0.1150E+02  0.4600E+02

ROW  10  0.3000E+01  0.5100E+02  0.4900E+02  0.2900E+02  0.5200E+02  0.5300E+02
         0.4000E+01  0.4400E+02  0.1150E+02

ROW  11  0.3550E+02  0.2000E+01  0.4800E+02  0.4500E+02  0.1600E+02  0.3700E+02
         0.3900E+02  0.4200E+02  0.8000E+01  0.3550E+02

   10 ROWS ARE READ.
      9.   COMPUTE
1KOC3                                            KOWARERU
```

2

SOLUTION IN 3 DIMENSIONS:
* *

FIT: DHAT : ALGORITHM: HARD SQUEEZE: (SEE PROGRAM DESCRIPTION)

RAW STRESS DHAT = 0.259638
STRESS DHAT = 0.046323
RAW STRESS DSTAR = 0.648471
COEF. ALIEN. DSTAR = 0.073158

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE, MBR 1979 V14) = 0.139224

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 4
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 15

F I N A L C O N F I G U R A T I O N

1	-0.9781	0.2760	0.1975
2	0.3209	-0.7008	0.0338
3	0.3421	0.8076	-0.1532
4	0.3106	0.5993	0.4858
5	0.6509	-0.4319	0.6627
6	1.2988	0.0245	-0.1024
7	-1.0233	0.0928	0.2827
8	0.4301	0.7753	-0.5685
9	-0.4224	-0.6139	-0.3698
10	-1.1396	0.1243	-0.1560
11	0.1102	-0.9462	-0.3125
DMEAN	0.0000	0.0000	0.0000
DSIGMA	0.7336	0.5776	0.3582

688

KOC3 KOWARERU

DISTANCES

7	1	0.2489	11	2	0.4739	10	1	0.4651	10	7	0.4549	8	3	0.4258
5	2	0.7594	9	2	0.9496	11	9	0.6272	4	3	0.6732	6	5	1.1016
10	9	1.0555	9	7	1.1379	8	4	1.0757	9	1	1.1542	4	2	1.3755
11	5	1.2279	9	6	1.2333	3	1	1.3764	6	3	1.2375	6	2	1.2252
6	4	1.2953	4	1	1.2649	5	4	1.0993	2	1	1.5551	3	2	1.5201
5	3	1.5159	7	4	1.4408	9	4	1.6593	10	4	1.6551	7	5	1.7951
9	2	1.5990	7	3	1.6016	8	5	1.7394	9	3	1.6339	11	1	1.6525
11	10	1.6530	11	6	1.5490	9	5	1.5011	11	7	1.6488	8	1	1.5961
9	6	1.8573	11	8	1.7696	8	7	1.8173	10	8	1.7487	11	4	1.7501
8	3	1.6471	7	2	1.5806	11	3	1.7763	10	3	1.6316	5	1	1.7479
10	2	1.6981	10	5	[illegible].0458	10	6	2.4411	6	1	2.2113	7	6	2.3548

A003 KOWARERU

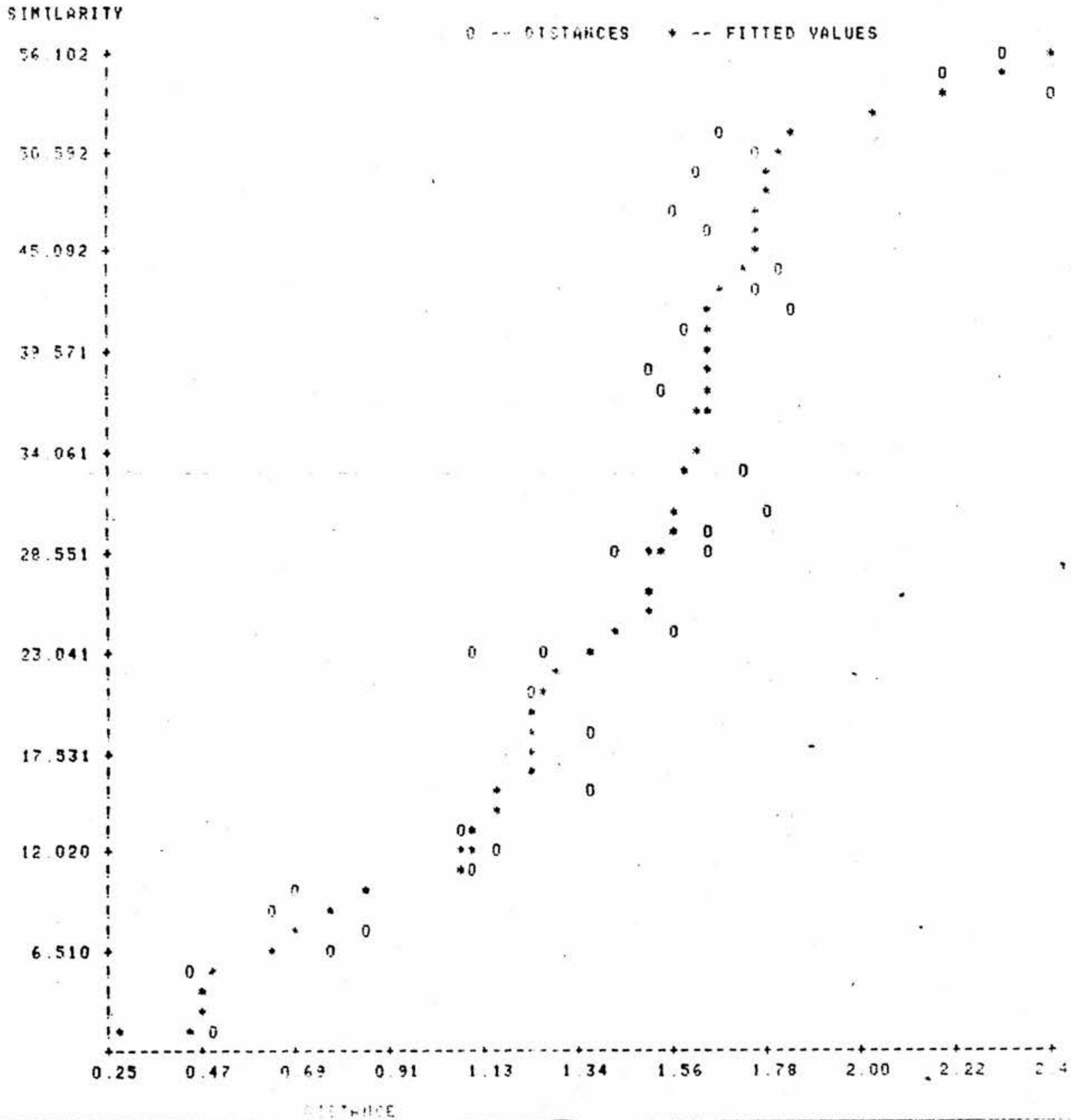
FITTED VALUES

PAIR		DHAT	(PAIRS ARE	ORDERED	ACCORDING	TO VALUES	IN	INPUT	MATRIX)					
7	1	0.2488	11	2	0.4549	10	1	0.4549	10	7	0.4549	8	3	0.4549
5	2	0.7273	9	2	0.7273	11	9	0.7273	4	3	0.7273	6	5	1.0785
10	9	1.0785	9	7	1.1068	8	4	1.1068	9	1	1.1542	4	2	1.2590
11	5	1.2590	8	6	1.2590	3	1	1.2590	6	3	1.2590	6	2	1.2590
6	4	1.2590	4	1	1.2590	5	4	1.2590	2	1	1.5079	3	2	1.5079
5	3	1.5079	7	4	1.5079	9	4	1.6371	10	4	1.6371	7	5	1.6371
8	2	1.6371	7	3	1.6371	8	5	1.6371	9	3	1.6371	11	1	1.6371
11	10	1.6371	11	6	1.6371	9	5	1.6371	11	7	1.6371	8	1	1.6371
9	6	1.7286	11	9	1.7286	8	7	1.7286	10	8	1.7286	11	4	1.7286
9	8	1.7286	7	2	1.7286	11	3	1.7286	10	3	1.7286	5	1	1.7286
10	2	1.7286	10	5	2.0458	10	6	2.3265	6	1	2.3265	7	6	2.3548

PAIR		DSTAR	(PAIRS ARE	ORDERED	ACCORDING	TO VALUES	IN	INPUT	MATRIX)					
7	1	0.2488	11	2	0.4258	10	1	0.4549	10	7	0.4651	8	3	0.4739
5	2	0.6272	9	2	0.6732	11	9	0.7594	4	3	0.8496	6	5	1.0555
10	9	1.0757	9	7	1.0993	8	4	1.1016	9	1	1.1379	4	2	1.1542
11	5	1.2252	8	6	1.2279	3	1	1.2375	6	3	1.2393	6	2	1.2648
6	4	1.2853	4	1	1.3755	5	4	1.3764	2	1	1.4408	3	2	1.5011
5	3	1.5158	7	4	1.5201	9	4	1.5490	10	4	1.5551	7	5	1.5806
8	2	1.5961	7	3	1.5380	8	5	1.6016	9	3	1.6316	11	1	1.6338
11	10	1.6471	11	6	1.6488	9	5	1.6523	11	7	1.6530	8	1	1.6551
9	6	1.6593	11	9	1.6881	8	7	1.7394	10	8	1.7479	11	4	1.7487
9	8	1.7501	7	2	1.7696	11	3	1.7763	10	3	1.7951	5	1	1.8173
10	2	1.8573	10	5	2.0453	10	6	2.2118	6	1	2.3548	7	6	2.4411

KOC3

KOWAPEPU



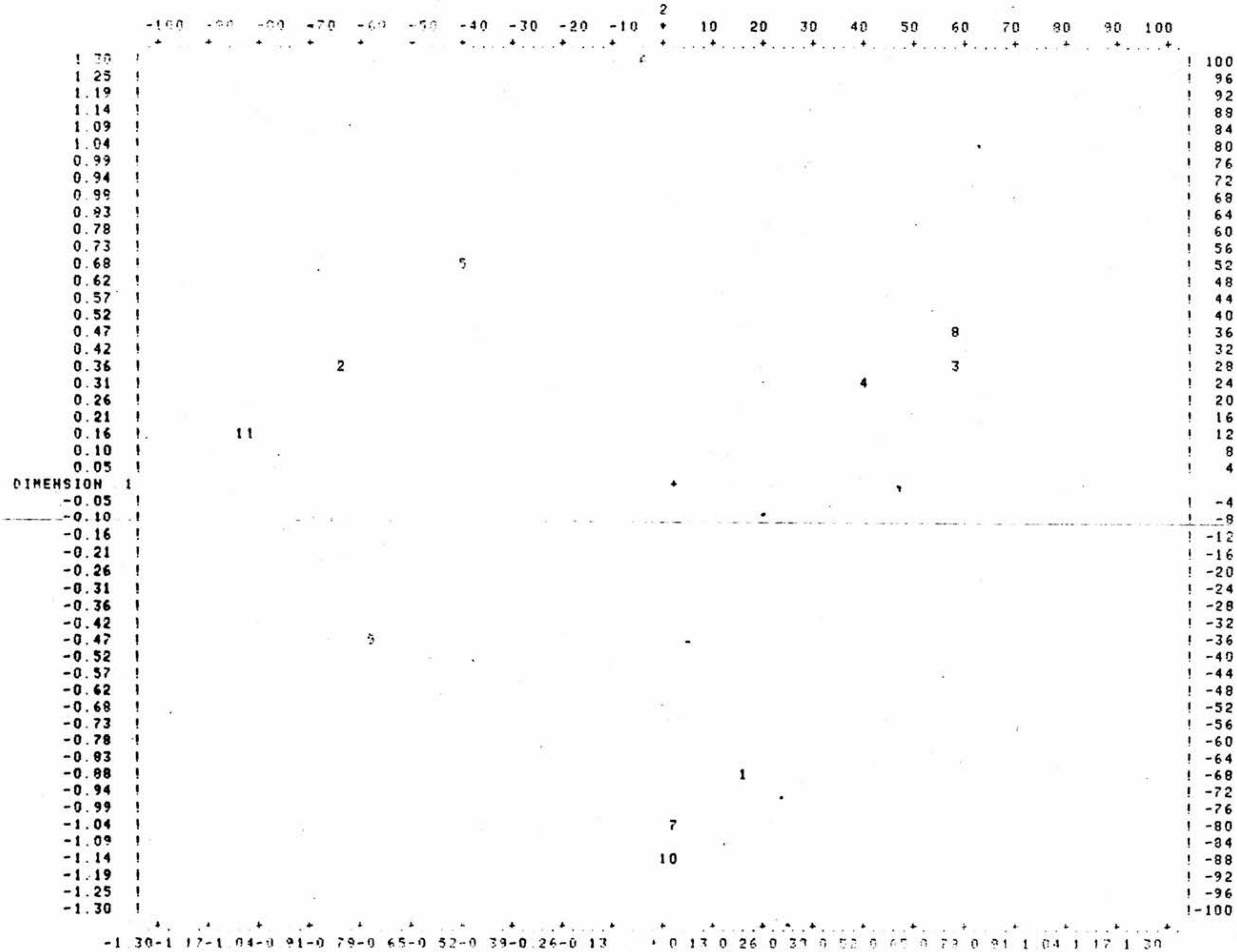
690

5

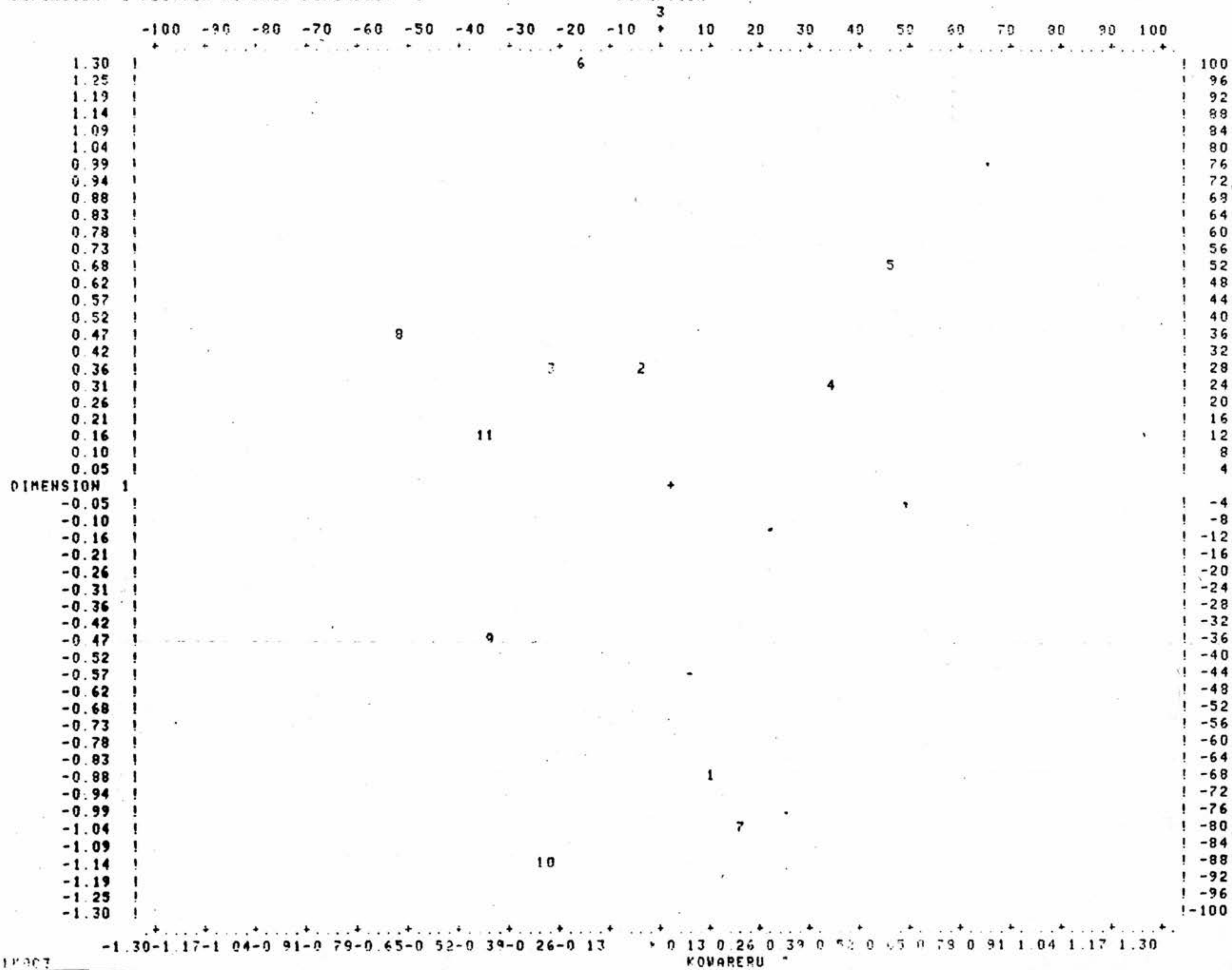
IKDC3 KOWARERU

FINAL CONFIGURATION

DIMENSION 2 PLOTTED AGAINST DIMENSION 1



DIMENSION 3 PLOTTED AGAINST DIMENSION 1

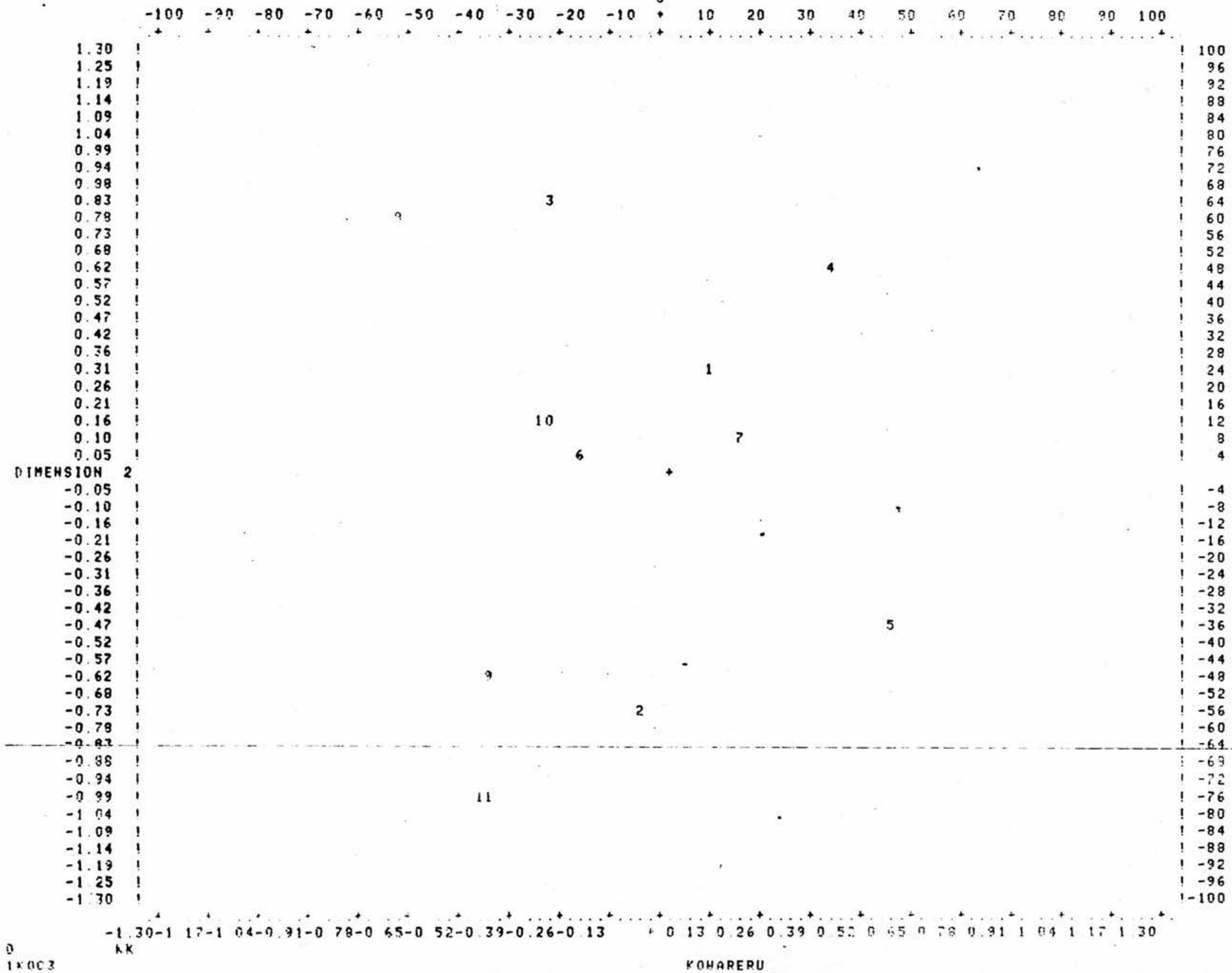


6

692

DIMENSION 3 PLOTTED AGAINST DIMENSION 2

7



0
1K003

8

SOLUTION IN 2 DIMENSIONS:

* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

```
RAW STRESS DHAT      =     0.894451
STRESS DHAT          =     0.065979
RAW STRESS DSTAR     =     1.901423
COEF. ALIEN. DSTAR   =     0.125110
```

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.170667

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 3
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 11

694

F I N A L C O N F I G U R A T I O N

1	-0.9152	0.2813
2	0.2654	-0.7094
3	0.4270	0.8413
4	0.2577	0.5046
5	0.8437	-0.5406
6	1.3461	-0.0936
7	-1.0401	0.1686
8	0.5907	0.0596
9	-0.5830	-0.5104
10	-1.1921	0.1263
11	-0.0001	-1.0276
CMEAN	0.0000	0.0000
CSIGMA	0.7904	0.6126

KOC3 KOWARERU

DISTANCES

7	1	0.1682	11	2	0.4145	10	1	0.3174	10	7	0.1578	8	3	0.2020
5	2	0.6024	9	2	0.8715	11	9	0.7793	4	3	0.3768	6	5	0.6725
9	7	0.8185	10	9	0.9811	8	4	0.5638	9	1	0.8586	4	2	1.2141
11	5	0.9743	8	6	1.2961	3	1	1.4543	6	3	1.3111	6	2	1.2438
6	4	1.2420	4	1	1.1940	5	4	1.1383	2	1	1.5413	3	2	1.5591
5	3	1.4434	9	4	1.3180	7	4	1.3406	10	4	1.4984	7	5	2.0129
8	5	1.5214	7	3	1.6139	8	2	1.7004	9	3	1.6873	11	1	1.5971
11	10	1.6590	11	6	1.6385	9	5	1.4270	11	7	1.5850	8	1	1.6516
9	6	1.9736	11	8	2.0731	8	7	1.8125	10	8	1.9680	11	4	1.5538
9	8	1.8810	7	2	1.5733	11	3	1.9171	10	3	1.7700	5	1	1.9415
10	2	1.6801	10	5	2.1423	10	6	2.5478	6	1	2.3922	7	6	2.4006

KOC3 KOWARERU

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

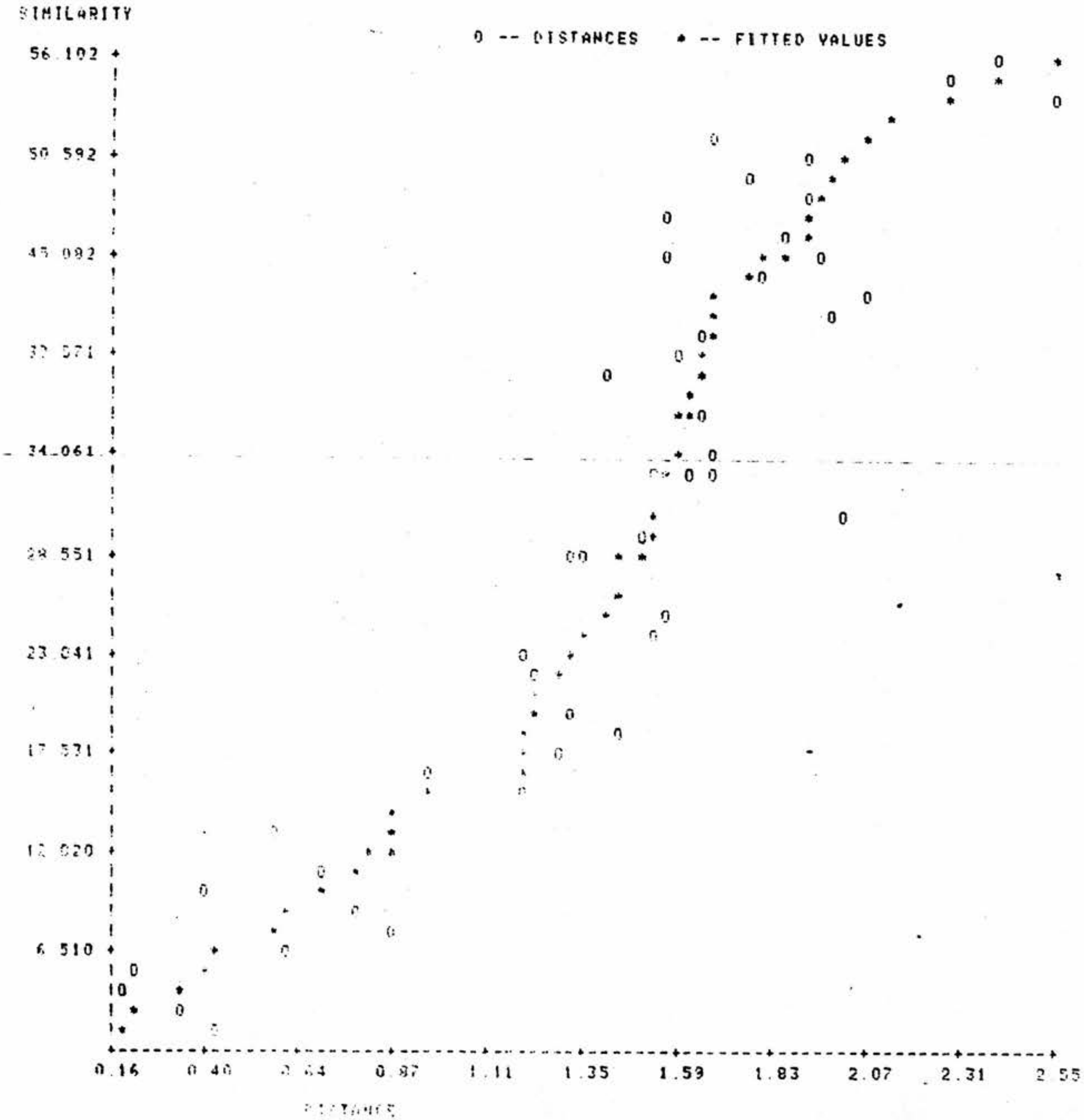
7	1	0.1682	11	2	0.2729	10	1	0.2729	10	7	0.2729	8	3	0.2729
5	2	0.6024	9	2	0.6750	11	9	0.6750	4	3	0.6750	6	5	0.6750
9	7	0.7544	10	9	0.7544	8	4	0.7544	9	1	0.8586	4	2	1.0942
11	5	1.0942	8	6	1.2771	3	1	1.2771	6	3	1.2771	6	2	1.2771
6	4	1.2771	4	1	1.2771	5	4	1.2771	2	1	1.4405	3	2	1.4405
5	3	1.4405	9	4	1.4405	7	4	1.4405	10	4	1.4984	7	5	1.6443
8	5	1.6443	7	3	1.6443	8	2	1.6443	9	3	1.6443	11	1	1.6443
11	10	1.6443	11	6	1.6443	9	5	1.6443	11	7	1.6443	8	1	1.6516
9	6	1.8313	11	8	1.8313	8	7	1.8313	10	8	1.8313	11	4	1.8313
9	8	1.8313	7	2	1.8313	11	3	1.8313	10	3	1.8313	5	1	1.8313
10	2	1.8313	10	5	2.1423	10	6	2.4135	6	1	2.4135	7	6	2.4135

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

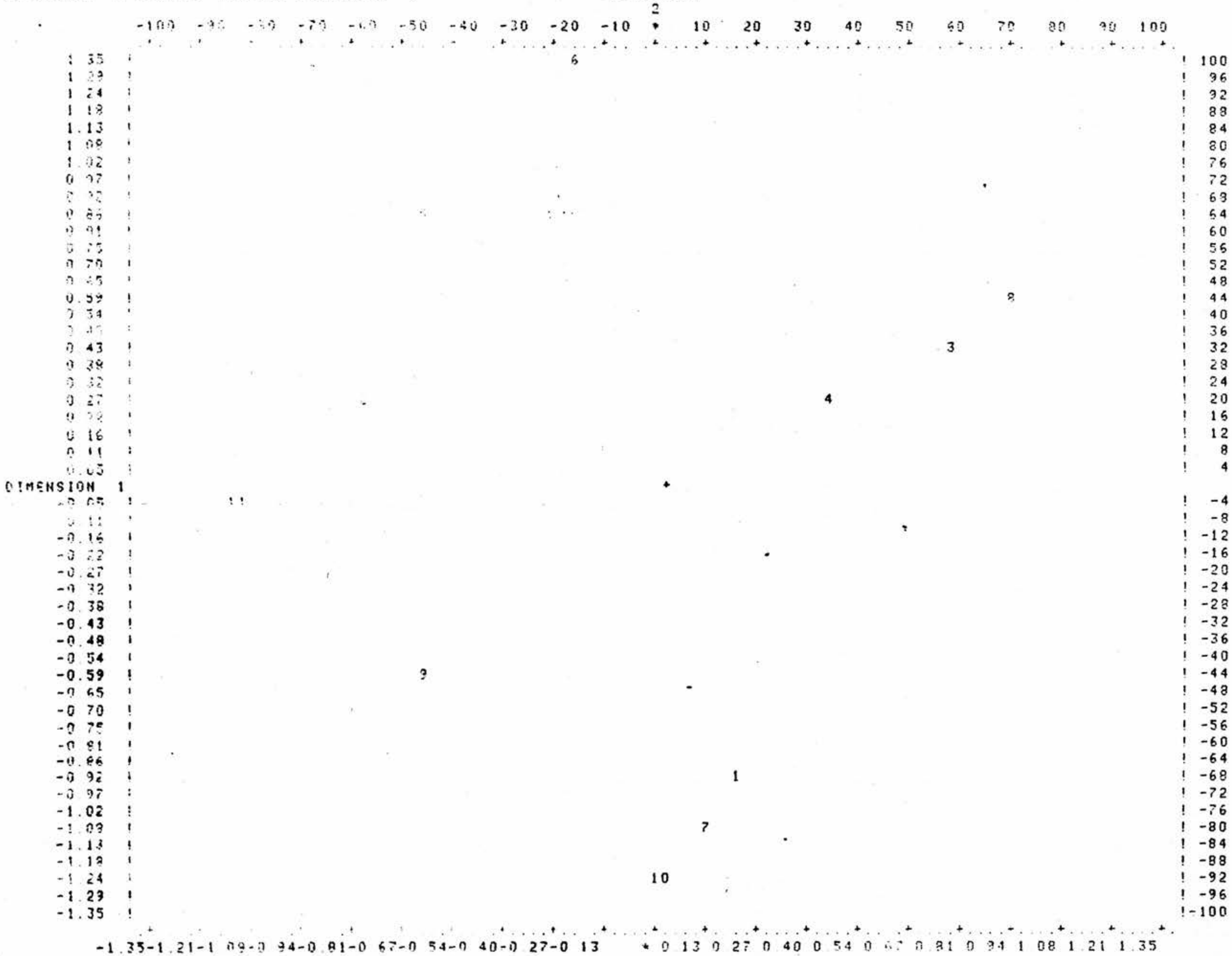
7	1	0.1578	11	2	0.1682	10	1	0.2020	10	7	0.3174	8	3	0.3768
5	2	0.4145	9	2	0.5638	11	9	0.6024	4	3	0.6725	6	5	0.7793
9	7	0.8185	10	9	0.8586	8	4	0.8715	9	1	0.8811	4	2	0.9743
11	5	1.1940	8	6	1.1983	3	1	1.2141	6	3	1.2420	6	2	1.2438
6	4	1.2961	4	1	1.3111	5	4	1.3180	2	1	1.3406	3	2	1.4270
5	3	1.4434	9	4	1.4543	7	4	1.4984	10	4	1.5214	7	5	1.5413
8	5	1.5538	7	3	1.5591	8	2	1.5733	9	3	1.5850	11	1	1.5971
11	10	1.6139	11	6	1.6395	9	5	1.6516	11	7	1.6590	8	1	1.6801
9	6	1.6873	11	9	1.7004	8	7	1.7700	10	8	1.8125	11	4	1.8810
9	8	1.9171	7	2	1.9415	11	3	1.9680	10	3	1.9736	5	1	2.0129
10	2	2.0731	10	5	2.1423	10	6	2.2922	6	1	2.4006	7	6	2.5478

KOC3

KOWARERU



DIMENSION 2 PLOTTED AGAINST DIMENSION 1



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+----------------------------------------------------------------------------------+
|                              M  D  S  (X)  PROGRAMS                              |
|                                                                                  |
|    AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND |
|    LANGUAGE.                                                                     |
|                                                                                  |
|    PROGRAMS AND SUPPORTING DOCUMENTATION       OTHER ENQUIRIES SHOULD            |
|    ARE DISTRIBUTED FROM                        BE ADDRESSED TO                   |
|                                                                                  |
|    MDS(X) PROJECT,                             MDS(X) PROJECT,                   |
|    PROGRAM LIBRARY UNIT,                       SOCIOLOGICAL RESEARCH UNIT,       |
|    UNIVERSITY OF EDINBURGH,                    UNIVERSITY COLLEGE,               |
|    18 BUCCLEUCH PLACE,                         P.O. BOX 78,                      |
|    EDINBURGH EH8 9LN,                          CARDIFF CF1 1XL,                  |
|    U.K.                                        U.K.                              |
|                                                                                  |
|    USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN  |
|    PUBLISHING RESULTS.                                                           |
+----------------------------------------------------------------------------------+

      1.     RUN NAME        KOK1
      2.     TASK NAME        KOWARERU
      3.     # OF STIMULI     11
      4.     PRINT DATA       YES
      5.     PARAMETERS       DATA TYPE(1),MINKOWSKI(2.0)
      6.     DIMENSION        2 TO 5
      7.     INPUT FORMAT     (10F5.0)
      8.     READ MATRIX

ROW  2  0.4700E+02

ROW  3  0.2100E+02  0.2400E+02

ROW  4  0.2200E+02  0.1100E+02  0.1000E+02

ROW  5  0.5200E+02  0.6000E+01  0.2600E+02  0.2000E+02

ROW  6  0.5000E+02  0.1800E+02  0.1300E+02  0.2300E+02  0.9000E+01

ROW  7  0.1000E+01  0.3400E+02  0.3200E+02  0.3500E+02  0.5100E+02  0.5500E+02

ROW  8  0.3100E+02  0.2700E+02  0.5000E+01  0.1400E+02  0.2900E+02  0.1900E+02
        0.3600E+02

ROW  9  0.1200E+02  0.7000E+01  0.3900E+02  0.2800E+02  0.4000E+02  0.4300E+02
        0.1700E+02  0.3800E+02

ROW 10  0.4000E+01  0.4600E+02  0.4900E+02  0.2500E+02  0.5300E+02  0.5400E+02
        0.3000E+01  0.4200E+02  0.1500E+02

ROW 11  0.4100E+02  0.2000E+01  0.4500E+02  0.3700E+02  0.1600E+02  0.3300E+02
        0.4400E+02  0.4800E+02  0.9000E+01  0.3000E+02

   10 ROWS ARE READ.
      9.     COMPUTE
```

OK1 KOWARERU

2

SOLUTION IN 3 DIMENSIONS:

* *

IT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

AW STRESS DHAT	=	0.067990
TRESS DHAT	=	0.023704
RAW STRESS DSTAR	=	0.183876
DEF. ALIEN. DSTAR	=	0.038975

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.138224

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 6
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 24

INAL CONFIGURATION

1	-1.0837	0.1093	-0.0274
2	0.3650	-0.6195	0.0782
3	0.2658	0.8153	-0.2562
4	0.1831	0.3040	0.7821
5	1.1312	-0.3009	0.2588
6	1.1938	0.2261	-0.3501
7	-1.0849	0.0754	-0.0299
8	0.1947	0.8956	-0.0902
9	-0.2803	-0.5343	-0.4559
10	-1.1246	-0.0978	0.1265
11	0.2400	-0.8732	-0.0359
MEAN	0.0000	0.0000	0.0000
SIGMA	0.7823	0.5360	0.3173

699

OK1 KOWARERU

DISTANCES

7	1	0.0341	11	2	0.3050	10	7	0.2367	10	1	0.2613	8	3	0.1976
5	2	0.8492	9	2	0.8419	11	9	0.7496	6	5	0.8077	4	3	1.1602
4	2	1.1753	9	1	1.1150	6	3	1.1033	8	4	1.0540	10	9	1.1147
11	5	1.0994	9	7	1.0957	6	2	1.2591	8	6	1.2304	5	4	1.2404
3	1	1.5401	4	1	1.5159	6	4	1.5197	3	2	1.4766	10	4	1.5170
5	3	1.5034	8	2	1.5339	9	4	1.5652	8	5	1.5589	11	10	1.5779
8	1	1.5021	7	3	1.5566	11	6	1.4890	7	2	1.6115	7	4	1.5230
8	7	1.5211	11	4	1.4347	9	8	1.5504	9	3	1.4695	9	5	1.5992
11	1	1.6485	10	8	1.6656	9	6	1.6620	11	7	1.6295	11	3	1.7030
10	2	1.5790	2	1	1.6251	11	8	1.7702	10	3	1.7068	6	1	2.3032
7	5	2.2663	5	1	2.2707	10	5	2.2688	10	6	2.3889	7	6	2.3060

700

OK1 KOWARERU 3

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0341	11	2	0.2502	10	7	0.2502	10	1	0.2502	8	3	0.2502
5	2	0.8121	9	2	0.8121	11	9	0.8121	6	5	0.8121	4	3	1.1147
4	2	1.1147	9	1	1.1147	6	3	1.1147	8	4	1.1147	10	9	1.1147
11	5	1.1147	9	7	1.1147	6	2	1.2433	8	6	1.2433	5	4	1.2433
3	1	1.5121	4	1	1.5121	6	4	1.5121	3	2	1.5121	10	4	1.5121
5	3	1.5121	8	2	1.5303	9	4	1.5303	8	5	1.5303	11	10	1.5303
8	1	1.5303	7	3	1.5303	11	6	1.5303	7	2	1.5303	7	4	1.5303
8	7	1.5303	11	4	1.5303	9	8	1.5303	9	3	1.5303	9	5	1.5992
11	1	1.6447	10	8	1.6447	9	6	1.6447	11	7	1.6447	11	3	1.6447
10	2	1.6447	2	1	1.6447	11	8	1.7385	10	3	1.7385	6	1	2.2772
7	5	2.2772	5	1	2.2772	10	5	2.2772	10	6	2.3475	7	6	2.3475

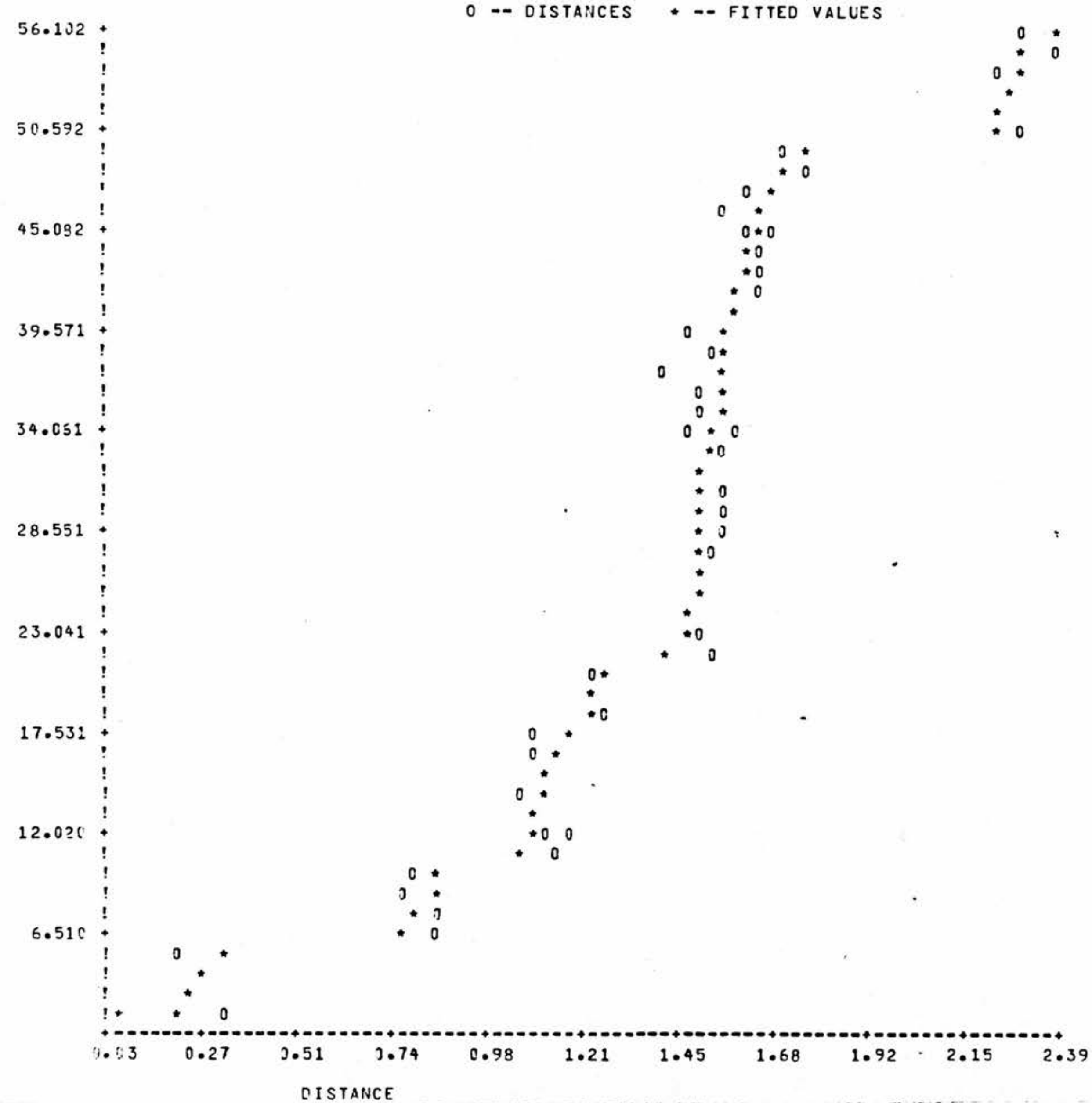
PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0341	11	2	0.1976	10	7	0.2367	10	1	0.2613	8	3	0.3050
5	2	0.7496	9	2	0.8077	11	9	0.8419	6	5	0.8492	4	3	1.0540
4	2	1.0957	9	1	1.0994	6	3	1.1033	8	4	1.1147	10	9	1.1150
11	5	1.1602	9	7	1.1753	6	2	1.2304	8	6	1.2404	5	4	1.2591
3	1	1.4347	4	1	1.4695	6	4	1.4766	3	2	1.4890	10	4	1.5021
5	3	1.5034	8	2	1.5159	9	4	1.5170	8	5	1.5197	11	10	1.5211
8	1	1.5230	7	3	1.5339	11	6	1.5401	7	2	1.5504	7	4	1.5566
8	7	1.5589	11	4	1.5652	9	8	1.5779	9	3	1.5790	9	5	1.5992
11	1	1.6115	10	8	1.6251	9	6	1.6295	11	7	1.6485	11	3	1.6620
10	2	1.6656	2	1	1.7030	11	8	1.7068	10	3	1.7702	6	1	2.2663
7	5	2.2688	5	1	2.2707	10	5	2.3032	10	6	2.3060	7	6	2.3889

JK1

COWARERU

SIMILARITY

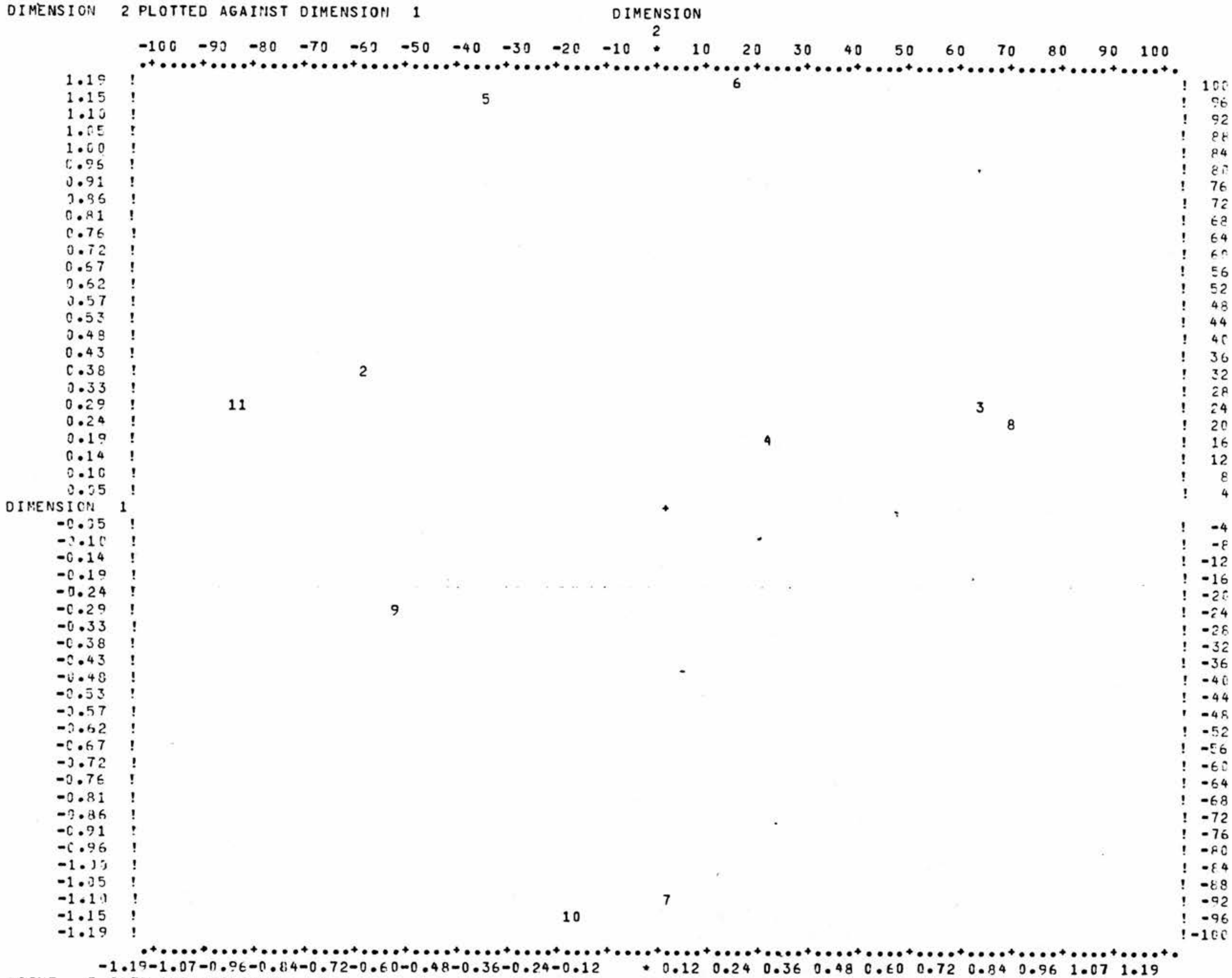


701

FINAL CONFIGURATION
DIMENSION 2 PLOTTED AGAINST DIMENSION 1

KOWARERU

5



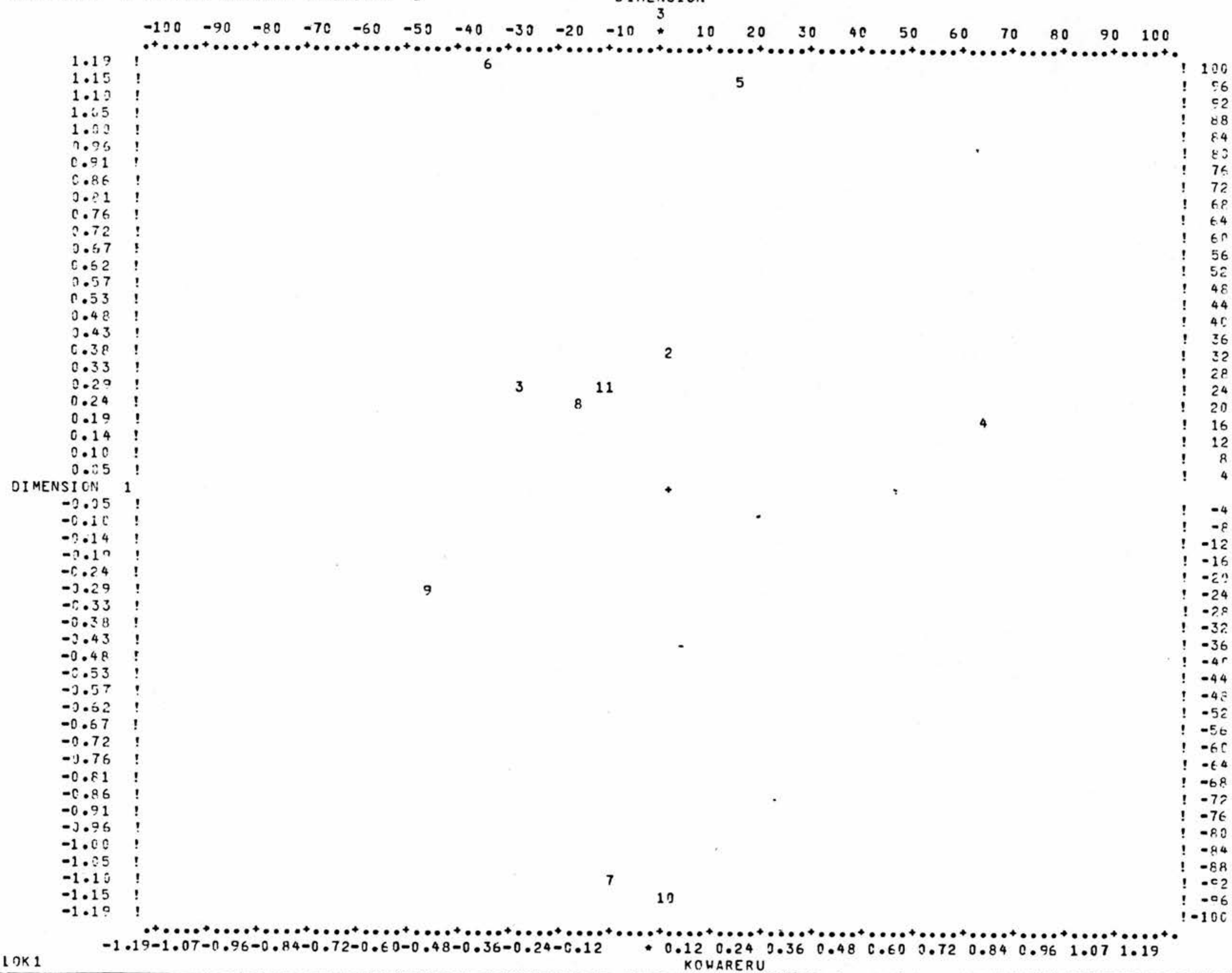
POINT 7 OVERLAYS POINT(S) 1

1OK1

FINAL CONFIGURATION

DIMENSION 3 PLOTTED AGAINST DIMENSION 1

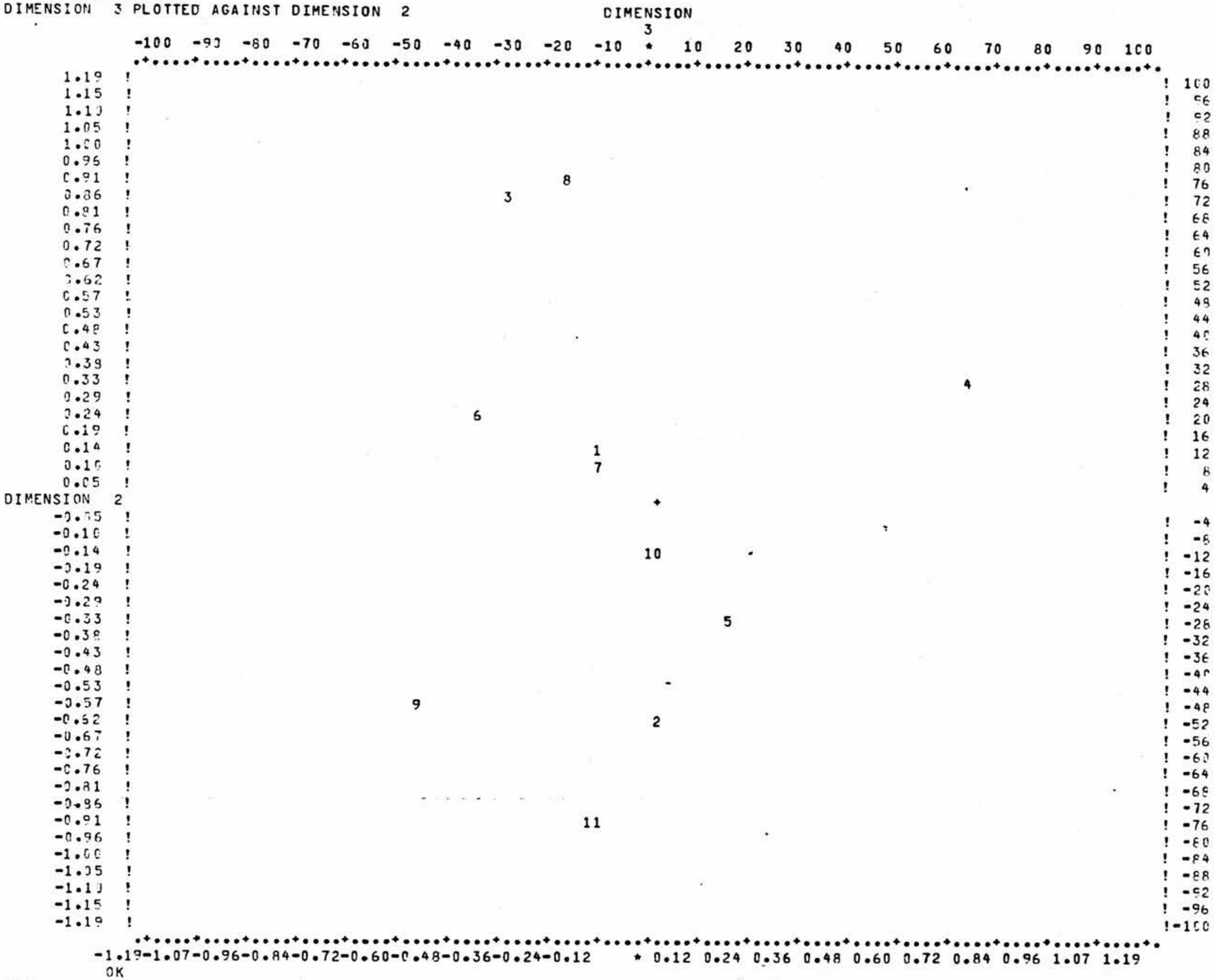
KOWARERU



1OK1

7

DIMENSION 3 PLOTTED AGAINST DIMENSION 2



OK

KOWARERU

OK1

704

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OLUTION IN  2 DIMENSIONS:
 *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

IT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM  DESCRIPTION)

AW STRESS DHAT       =      0.631938
TRESS DHAT           =      0.072268
AW STRESS DSTAR      =      1.190877
OEF. ALIEN. DSTAR    =      0.099085

TRESS1 BASED ON APPROXIMATION TO RANDOM DATA  (SPENCE,MBR 1979 V14) =     0.170667

PTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION   2
PTIMAL SOLUTION USING DHAT  WAS REACHED AFTER ITERATION  11


 I N A L   C O N F I G U R A T I O N
   1     -1.0441       0.2138
   2      0.3846      -0.5589
   3      0.3975       0.7717
   4      0.1840       0.3499
   5      1.1405      -0.4103
   6      1.2642       0.2205
   7     -1.1450       0.1767
   8      0.2438       0.9722
   9     -0.4207      -0.6391
  10     -1.1994      -0.1191
  11      0.1946      -0.9774
 EAN     0.0000       0.0000
 IGMA    0.8176       0.5758


K1                                                              KOWARERU

DISTANCES
```

7	1	0.1074	11	2	0.4556	10	7	0.3007	10	1	0.3673	8	3	0.2527
5	2	0.7704	9	2	0.8092	11	9	0.7021	6	5	0.6428	4	3	0.4728
4	2	0.9306	9	1	1.0565	6	3	1.0271	8	4	0.6252	10	9	0.9364
11	5	1.1028	9	7	1.0910	6	2	1.1752	8	6	1.2675	5	4	1.2218
3	1	1.5459	4	1	1.2356	6	4	1.0880	3	2	1.3306	10	4	1.4607
5	3	1.3961	8	2	1.5376	9	4	1.1592	8	5	1.6478	11	10	1.6371
8	1	1.4946	7	3	1.6533	11	6	1.6059	7	2	1.6972	7	4	1.3402
8	7	1.6005	11	4	1.3273	9	8	1.7430	9	3	1.6309	9	5	1.5778
11	1	1.7186	10	8	1.8053	9	6	1.8915	11	7	1.7682	11	3	1.7608
10	2	1.6439	2	1	1.6242	11	8	1.9502	10	3	1.8286	6	1	2.3084
7	5	2.3596	5	1	2.2720	10	5	2.3579	10	6	2.4869	7	6	2.4096

9

706

K1 KOWARERU

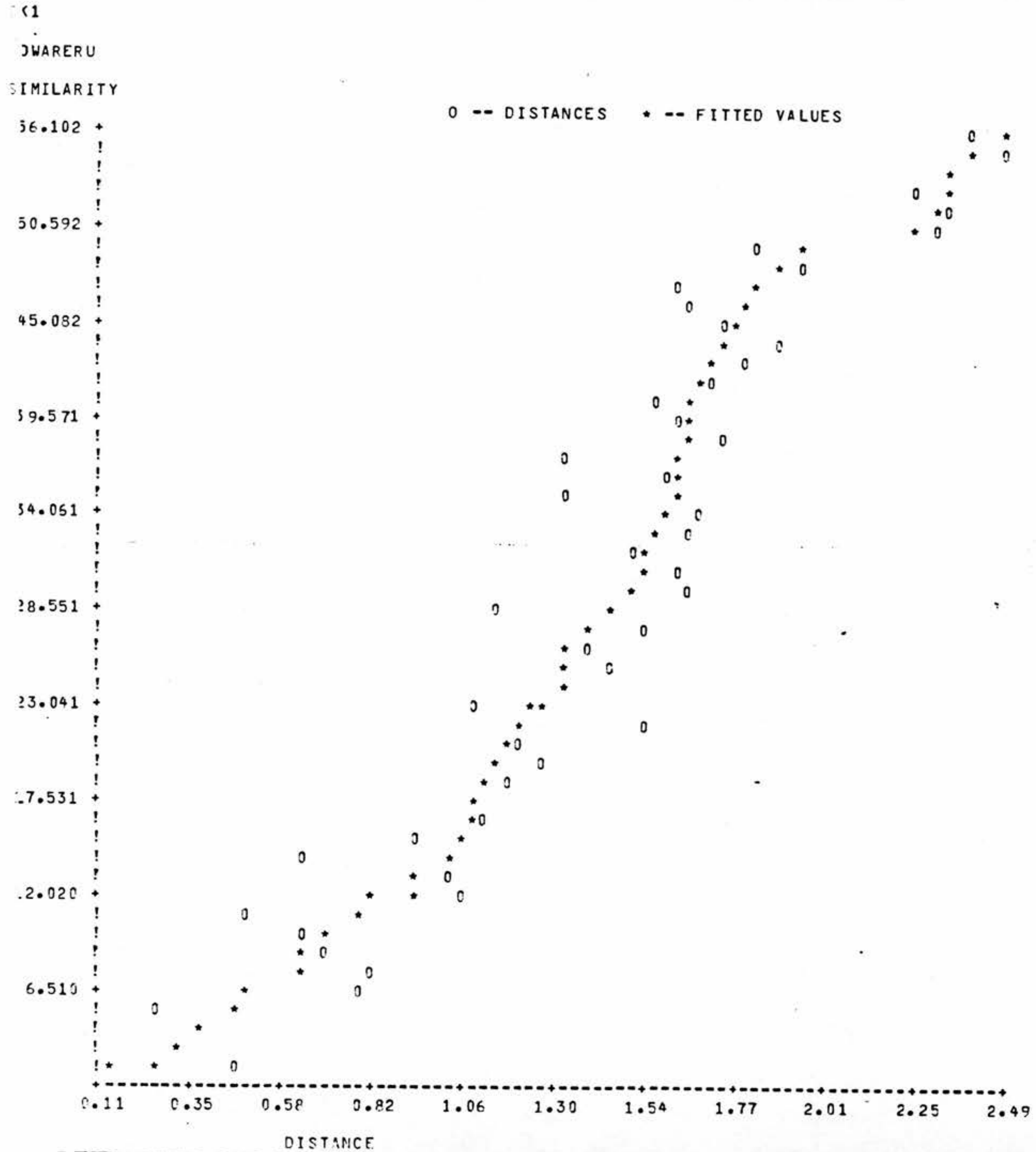
FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

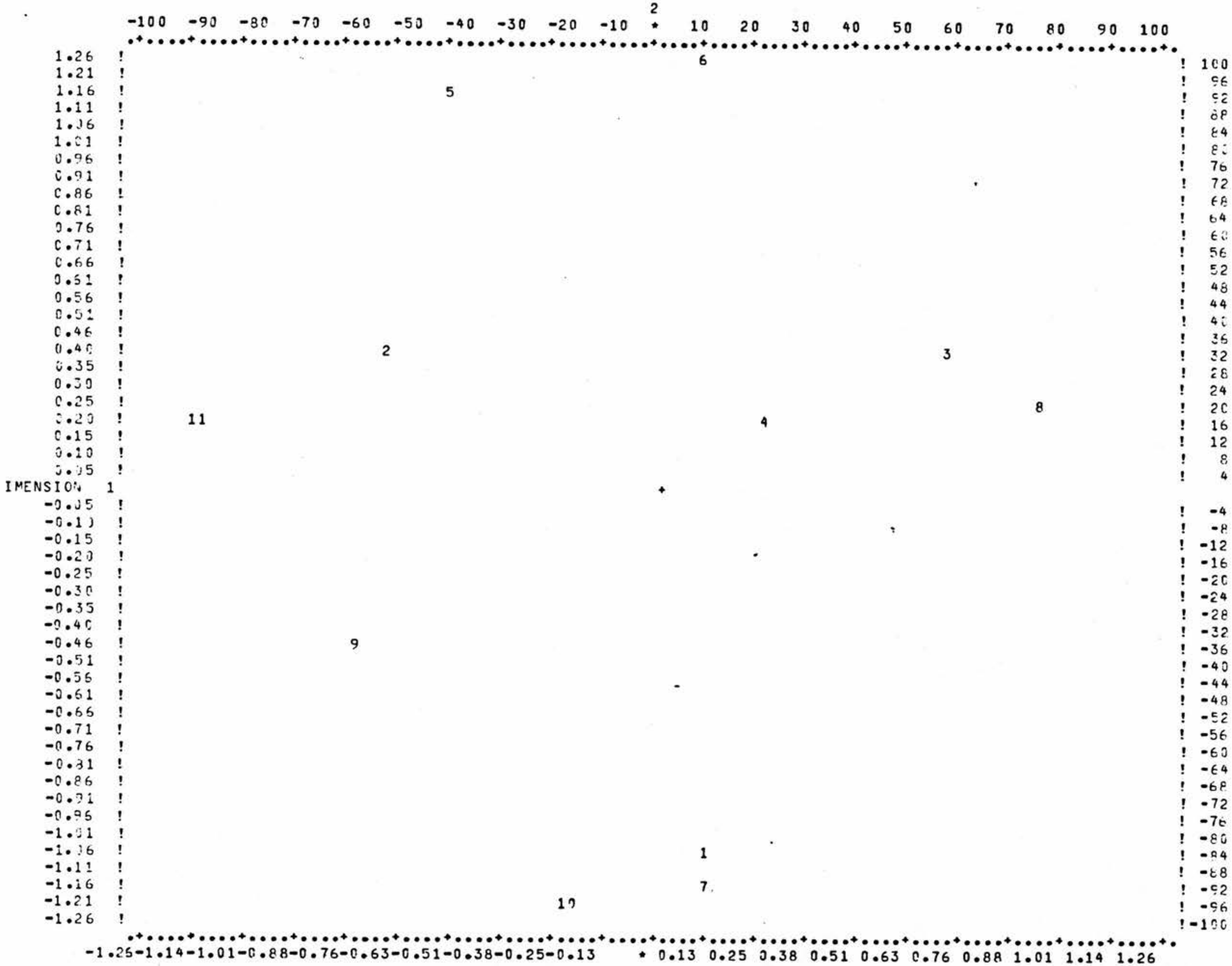
7	1	0.1074	11	2	0.3451	10	7	0.3451	10	1	0.3451	8	3	0.3451
5	2	0.6795	9	2	0.6795	11	9	0.6795	6	5	0.6795	4	3	0.6795
4	2	0.9099	9	1	0.9099	6	3	0.9099	8	4	0.9099	10	9	0.9364
11	5	1.0969	9	7	1.0969	6	2	1.1752	8	6	1.2446	5	4	1.2446
3	1	1.2898	4	1	1.2898	6	4	1.2898	3	2	1.3306	10	4	1.3884
5	3	1.3884	8	2	1.3884	9	4	1.3884	8	5	1.5560	11	10	1.5560
8	1	1.5560	7	3	1.5560	11	6	1.5560	7	2	1.5560	7	4	1.5560
8	7	1.5560	11	4	1.5560	9	8	1.6506	9	3	1.6506	9	5	1.6506
11	1	1.7186	10	8	1.7497	9	6	1.7497	11	7	1.7497	11	3	1.7497
10	2	1.7497	2	1	1.7497	11	8	1.8894	10	3	1.8894	6	1	2.3084
7	5	2.3158	5	1	2.3158	10	5	2.3579	10	6	2.4482	7	6	2.4482

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1074	11	2	0.2527	10	7	0.3007	10	1	0.3673	8	3	0.4596
5	2	0.4728	9	2	0.6252	11	9	0.6428	6	5	0.7021	4	3	0.7704
4	2	0.8092	9	1	0.9306	6	3	0.9364	8	4	1.0271	10	9	1.0565
11	5	1.0880	9	7	1.0910	6	2	1.1028	8	6	1.1592	5	4	1.1752
3	1	1.2218	4	1	1.2356	6	4	1.2675	3	2	1.3273	10	4	1.3306
5	3	1.3402	8	2	1.3961	9	4	1.4607	8	5	1.4946	11	10	1.5376
8	1	1.5459	7	3	1.5778	11	6	1.6005	7	2	1.6059	7	4	1.6242
8	7	1.6309	11	4	1.6371	9	8	1.6439	9	3	1.6478	9	5	1.6533
11	1	1.6972	10	8	1.7186	9	6	1.7430	11	7	1.7608	11	3	1.7682
10	2	1.8093	2	1	1.8286	11	8	1.8915	10	3	1.9502	6	1	2.2720
7	5	2.3084	5	1	2.3579	10	5	2.3596	10	6	2.4096	7	6	2.4869


K1
DWARERU
SIMILARITY
0 -- DISTANCES * -- FITTED VALUES
56.102
50.592
45.082
39.571
34.061
28.551
23.041
17.531
12.020
6.510
0.11
0.35
0.58
0.82
1.06
1.30
1.54
1.77
2.01
2.25
2.49
DISTANCE

IMENSION 2 PLOTTED AGAINST DIMENSION 1



10. FINISH

```
+------------------------------------------------------------------------------+
|                                                                              |
|                         M  D  S  (X)  PROGRAMS                               |
|                                                                              |
|     AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND |
|     LANGUAGE.                                                                |
|                                                                              |
|     PROGRAMS AND SUPPORTING DOCUMENTATION       OTHER ENQUIRIES SHOULD       |
|     ARE DISTRIBUTED FROM                        BE ADDRESSED TO              |
|                                                                              |
|     MDS(X) PROJECT,                             MDS(X) PROJECT,              |
|     PROGRAM LIBRARY UNIT,                       SOCIOLOGICAL RESEARCH UNIT,  |
|     UNIVERSITY OF EDINBURGH,                    UNIVERSITY COLLEGE,          |
|     18 BUCCLEUCH PLACE,                         P.O. BOX 78,                 |
|     EDINBURGH EH8 9LN,                          CARDIFF CF1 1XL,             |
|     U.K.                                        U.K.                         |
|                                                                              |
|     USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN |
|     PUBLISHING RESULTS.                                                      |
|                                                                              |
+------------------------------------------------------------------------------+

      1.    RUN NAME       KOK2
      2.    TASK NAME       KOWARERU
      3.    £ OF STIMULI    11
      4.    PRINT DATA      YES
      5.    PARAMETERS      DATA TYPE(1),MINKOWSKI(2.0)
      6.    DIMENSION       2 TO 5
      7.    INPUT FORMAT    (10F5.0)
      8.    READ MATRIX

ROW   2  0.2000E+02

ROW   3  0.1600E+02  0.2700E+02

ROW   4  0.2400E+02  0.1900E+02  0.9000E+01

ROW   5  0.5100E+02  0.7000E+01  0.3300E+02  0.2500E+02

ROW   6  0.5200E+02  0.2200E+02  0.1500E+02  0.2100E+02  0.6000E+01

ROW   7  0.1000E+01  0.5300E+02  0.3200E+02  0.3000E+02  0.4600E+02  0.5500E+02

ROW   8  0.3100E+02  0.2800E+02  0.5000E+01  0.1000E+02  0.2600E+02  0.1700E+02
         0.4400E+02

ROW   9  0.1100E+02  0.1300E+02  0.3500E+02  0.1800E+02  0.3800E+02  0.3900E+02
         0.1200E+02  0.3400E+02

ROW  10  0.3000E+01  0.4900E+02  0.5000E+02  0.4000E+02  0.5400E+02  0.4700E+02
         0.4000E+01  0.2900E+02  0.1400E+02

ROW  11  0.4200E+02  0.2000E+01  0.4800E+02  0.4300E+02  0.2300E+02  0.4100E+02
         0.3700E+02  0.4500E+02  0.8000E+01  0.3600E+02

   10 ROWS ARE READ.
      9.    COMPUTE
```

709

10K2 KOWARERU

2

SOLUTION IN 3 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

RAW STRESS DHAT	=	0.326599
STRESS DHAT	=	0.051954
RAW STRESS DSTAR	=	0.745804
COEF. ALIEN. DSTAR	=	0.078449

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.138224

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 4
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 19

F I N A L C O N F I G U R A T I O N

1	-0.8093	-0.2958	0.1557
2	0.2163	0.8650	-0.2416
3	0.5882	-0.7978	-0.0288
4	0.4325	-0.4753	-0.7093
5	0.6238	0.6765	0.6146
6	0.8179	0.0852	0.7033
7	-0.9911	-0.2800	0.1903
8	0.6669	-0.8100	-0.2115
9	-0.5848	0.3520	-0.3798
10	-0.9314	-0.2714	0.3899
11	-0.0290	0.9516	-0.4827
OMEAN	0.0000	0.0000	0.0000
OSIGMA	0.6695	0.6031	0.4337

710

0K2 KOWARERU

DISTANCES

7	1	0.1857	11	2	0.3546	10	1	0.2652	10	7	0.2085	8	3	0.1993
6	5	0.6286	5	2	0.9668	11	9	0.8241	4	3	0.7690	8	4	0.6440
9	1	0.8700	9	7	0.9431	9	2	0.9613	10	9	1.0494	6	3	1.1698
3	1	1.4964	8	6	1.2888	9	4	1.3520	4	2	1.4359	2	1	1.5992
6	4	1.5678	6	2	1.3648	11	5	1.3061	4	1	1.5239	5	4	1.7652
8	5	1.7012	3	2	1.7171	8	2	1.7348	10	8	1.7907	7	4	1.6952
8	1	1.6058	7	3	1.6764	5	3	1.6090	9	8	1.7162	9	3	1.6797
11	10	1.7525	11	7	1.7015	9	5	1.5985	9	6	1.7922	10	4	1.7635
11	6	1.6953	11	1	1.6039	11	4	1.5166	8	7	1.7865	11	8	1.9133
7	5	1.9242	10	6	1.8126	11	3	1.9098	10	2	1.7342	10	3	1.6618
5	1	1.7916	6	1	1.7587	7	2	1.7191	10	5	1.8351	7	6	1.9154

114

OK2 KCWARERU 3

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1857	11	2	0.2569	10	1	0.2569	10	7	0.2569	8	3	0.2569
6	5	0.6286	5	2	0.8010	11	9	0.8010	4	3	0.8010	8	4	0.8010
9	1	0.8700	9	7	0.9431	9	2	0.9613	10	9	1.0494	6	3	1.1693
3	1	1.3791	8	6	1.3791	9	4	1.3791	4	2	1.4359	2	1	1.4595
6	4	1.4595	6	2	1.4595	11	5	1.4595	4	1	1.5239	5	4	1.6903
8	5	1.6903	3	2	1.6903	8	2	1.6903	10	8	1.6903	7	4	1.6903
8	1	1.6903	7	3	1.6903	5	3	1.6903	9	8	1.6903	9	3	1.6903
11	10	1.6903	11	7	1.6903	9	5	1.6903	9	6	1.6903	10	4	1.6903
11	6	1.6903	11	1	1.6903	11	4	1.6903	8	7	1.7865	11	8	1.8028
7	5	1.8028	10	6	1.8028	11	3	1.8028	10	2	1.8028	10	3	1.8028
5	1	1.8028	6	1	1.8028	7	2	1.8028	10	5	1.8351	7	6	1.9154

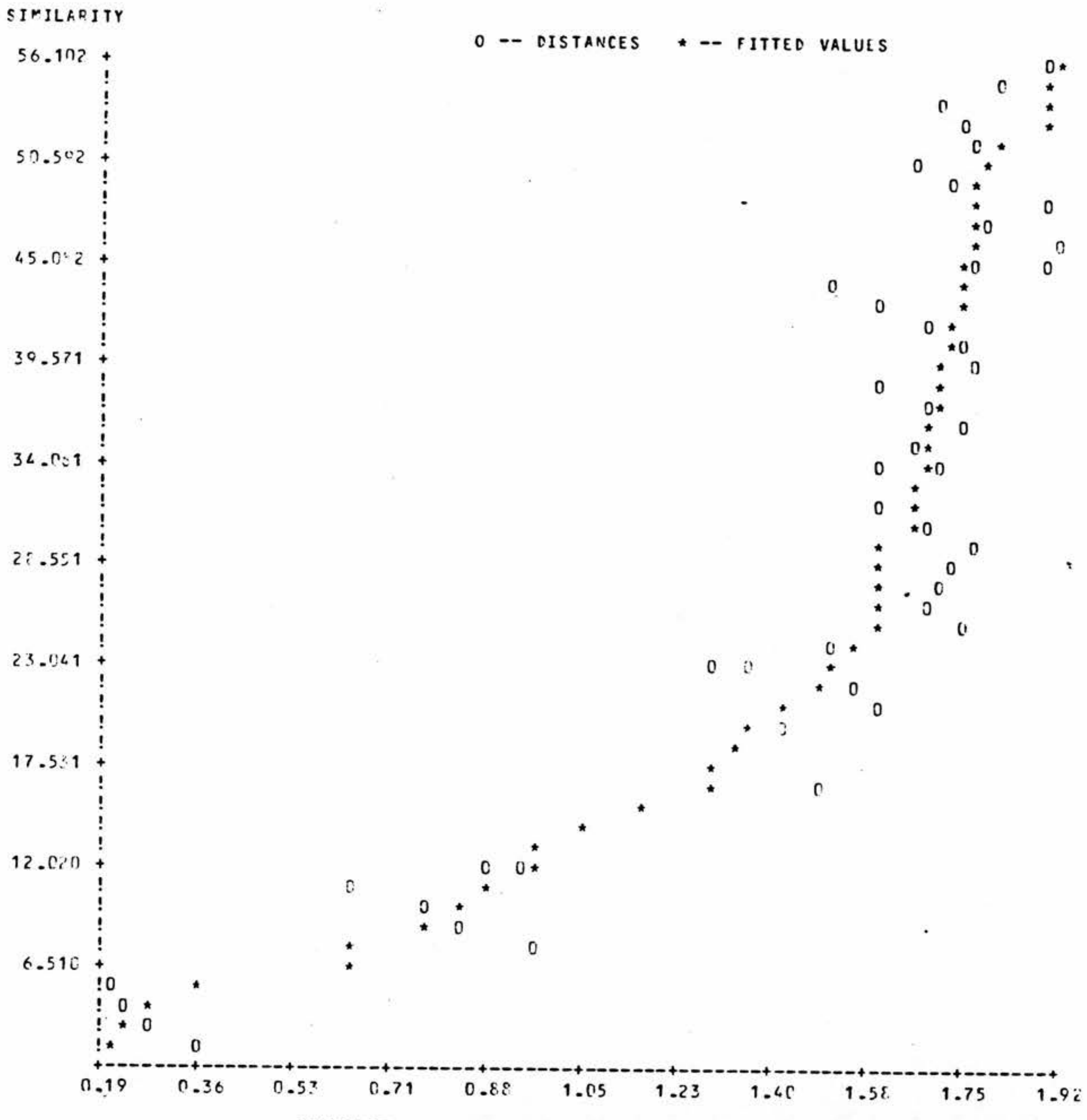
PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1857	11	2	0.1993	10	1	0.2085	10	7	0.2652	8	3	0.3546
6	5	0.6286	5	2	0.6440	11	9	0.7690	4	3	0.8241	8	4	0.8700
9	1	0.9431	9	7	0.9613	9	2	0.9668	10	9	1.0494	6	3	1.1698
3	1	1.2888	8	6	1.3061	9	4	1.3520	4	2	1.3643	2	1	1.4359
6	4	1.4964	6	2	1.5166	11	5	1.5239	4	1	1.5673	5	4	1.5985
8	5	1.5992	3	2	1.6039	8	2	1.6058	10	8	1.6090	7	4	1.6618
8	1	1.6764	7	3	1.6797	5	3	1.6952	9	8	1.6953	9	3	1.7012
11	10	1.7015	11	7	1.7162	9	5	1.7171	9	6	1.7191	10	4	1.7342
11	6	1.7348	11	1	1.7525	11	4	1.7587	8	7	1.7635	11	8	1.7652
7	5	1.7365	10	6	1.7907	11	3	1.7916	10	2	1.7922	10	3	1.8126
5	1	1.8351	6	1	1.9099	7	2	1.9133	10	5	1.9154	7	6	1.9242

4.

OK2

KOWARERU

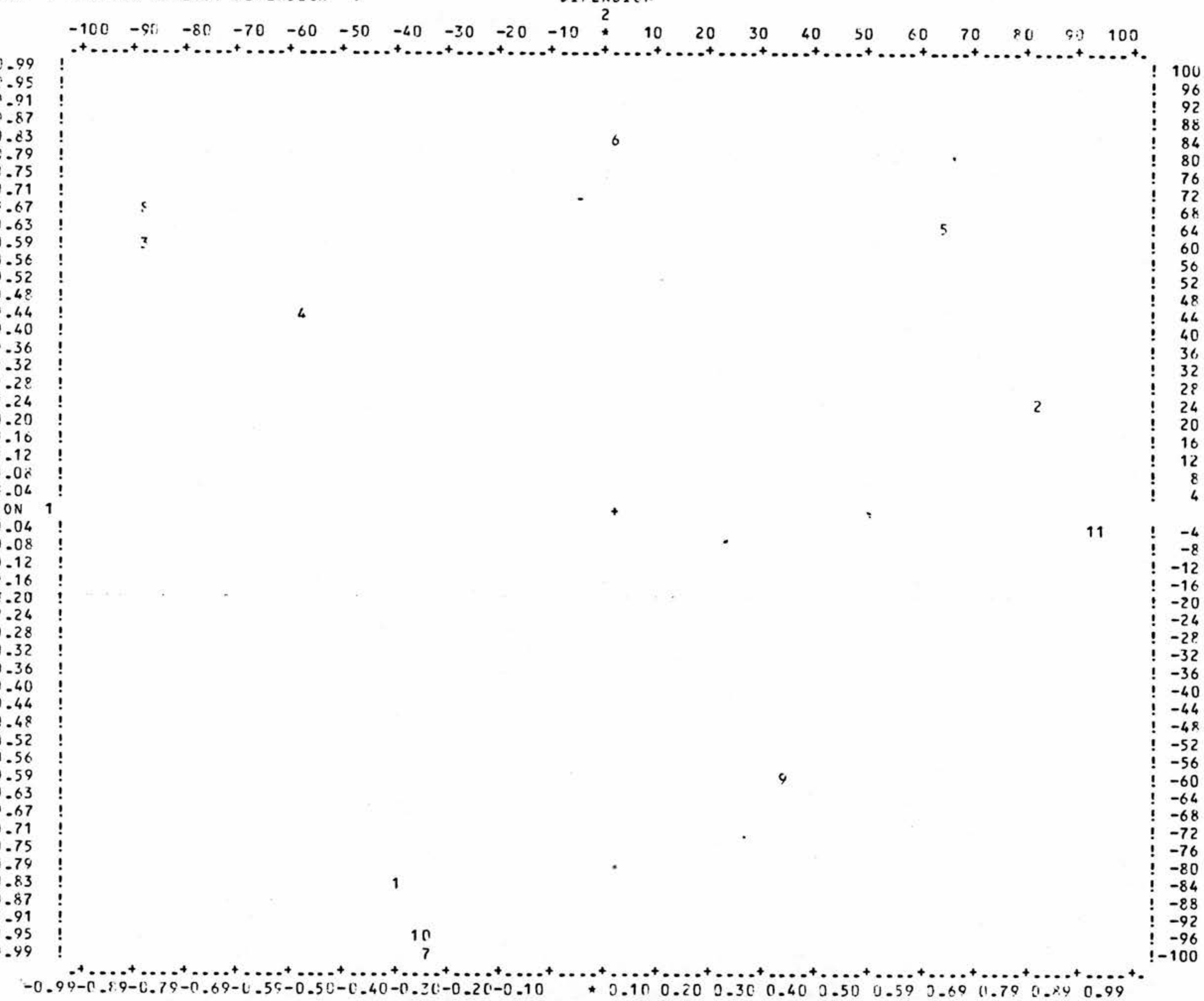


712

10K2 KOWARERU

5

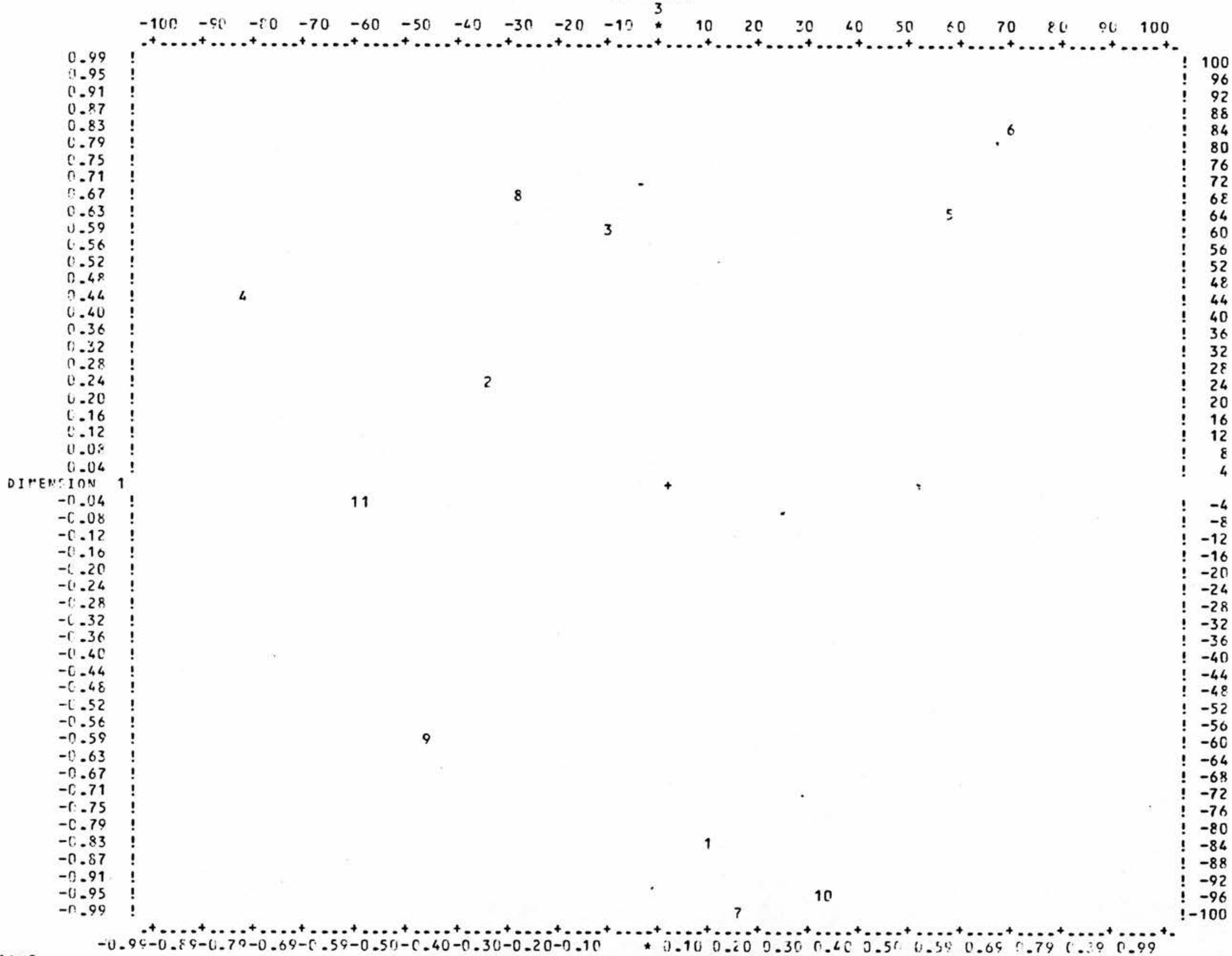
FINAL CONFIGURATION
DIMENSION 2 PLOTTED AGAINST DIMENSION 1



10K2

6

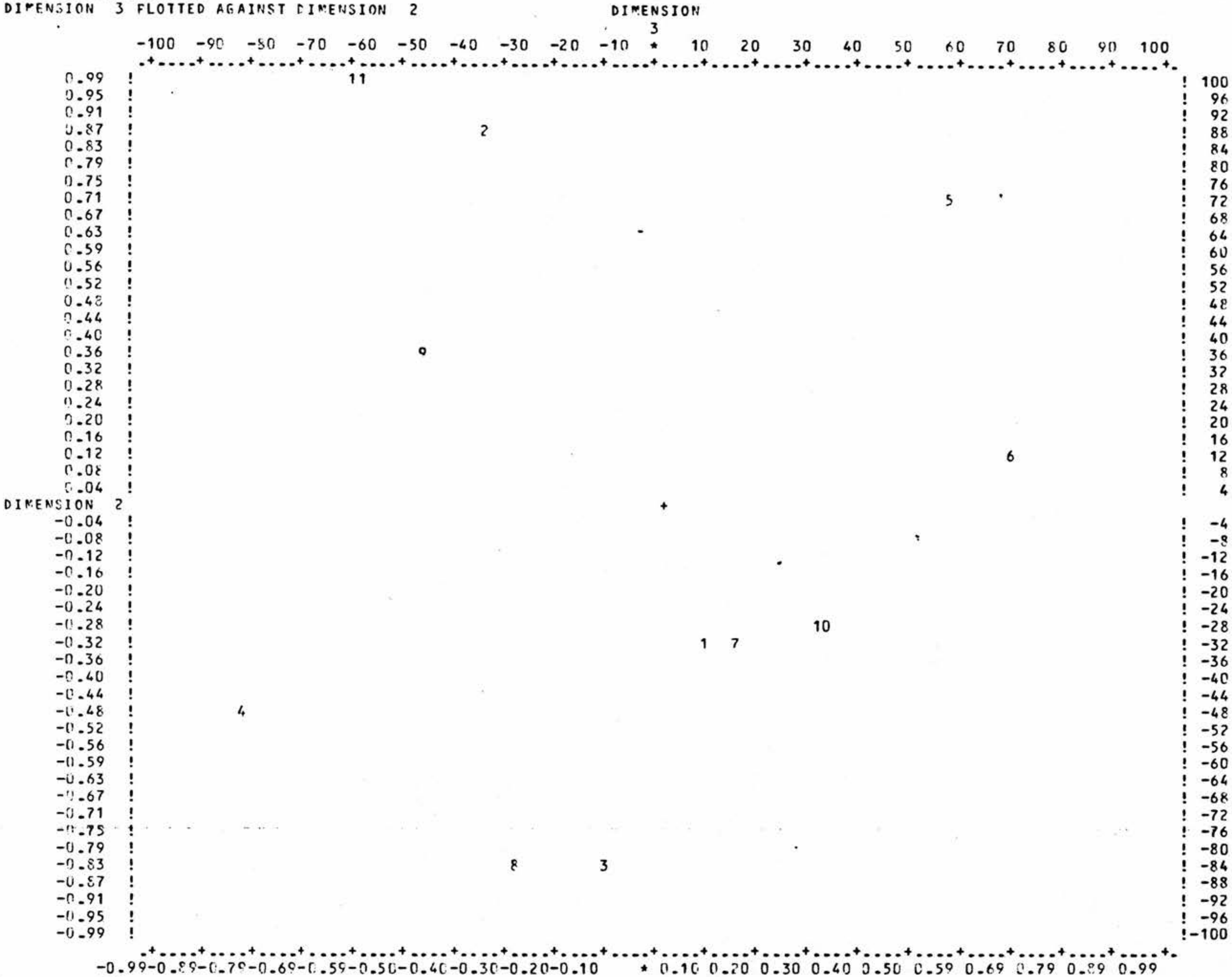
FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 1



114

10K2

FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 2



0
OK
10K2
KOWARERU

7

715

8

```
SOLUTION IN  2 DIMENSIONS:
 *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM  DESCRIPTION)

RAW STRESS DHAT      =     0.892040
STRESS DHAT          =     0.085862
RAW STRESS DSTAR     =     2.364077
COEF. ALIEN. DSTAR   =     0.139436


STRESS1 BASED ON APPROXIMATION TO RANDOM DATA  (SPENCE,MBR 1979 V14) =      0.170667

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION   7
OPTIMAL SOLUTION USING DHAT  WAS REACHED AFTER ITERATION  14


F I N A L   C O N F I G U R A T I O N
     1      -0.8538      -0.0991
     2       0.4374       0.7575
     3       0.2459      -0.9962
     4       0.2757      -0.5184
     5       1.0457       0.4226
     6       1.1728      -0.0560
     7      -1.1596      -0.1644
     8       0.4131      -0.9488
     9      -0.4273       0.5201
    10      -1.1945       0.0276
    11       0.0546       1.0551
  DMEAN    0.0000       0.0000
  DSIGMA   0.7782       0.6200


OK2                                                                  KOWARERU

 DISTANCES

  7  1  0.3126   11  2  0.4849   10  1  0.3634   10  7  0.1951    8  3  0.1738
  6  5  0.4952    5  2  0.6944   11  9  0.7267    4  3  0.4787    8  4  0.4518
  9  1  0.7463    9  7  0.9951    9  2  0.9063   10  9  0.9033    6  3  1.3202
  3  1  1.4192    8  6  1.1722    9  4  1.2596    4  2  1.2861    2  1  1.5495
  6  4  1.0092    6  2  1.0967   11  5  1.1757    4  1  1.2049    5  4  1.2158
  8  5  1.5102    3  2  1.7641    8  2  1.7065   10  8  1.8809    7  4  1.4783
  8  1  1.5255    7  3  1.6332    5  3  1.6286    9  8  1.6973    9  3  1.6631
 11 10  1.6174   11  7  1.7208    9  5  1.4861    9  6  1.7100   10  4  1.5683
 11  6  1.5764   11  1  1.4688   11  4  1.5889    8  7  1.7575   11  8  2.0357
  7  5  2.2820   10  6  2.3688   11  3  2.0602   10  2  1.7877   10  3  1.7672
  5  1  1.9698    6  1  2.0271    7  2  1.8439   10  5  2.2747    7  6  2.3349
```

716

OK2 KOWARERU

717

9

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.3060	11	2	0.3060	10	1	0.3060	10	7	0.3060	8	3	0.3060
6	5	0.4952	5	2	0.5879	11	9	0.5879	4	3	0.5879	8	4	0.5879
9	1	0.7463	9	7	0.9349	9	2	0.9349	10	9	0.9349	6	3	1.2463
3	1	1.2463	8	6	1.2463	9	4	1.2463	4	2	1.2463	2	1	1.2463
6	4	1.2463	6	2	1.2463	11	5	1.2463	4	1	1.2463	5	4	1.2463
8	5	1.5102	3	2	1.6302	8	2	1.6302	10	8	1.6302	7	4	1.6302
8	1	1.6302	7	3	1.6302	5	3	1.6302	9	8	1.6302	9	3	1.6302
11	10	1.6302	11	7	1.6302	9	5	1.6302	9	6	1.6302	10	4	1.6302
11	6	1.6302	11	1	1.6302	11	4	1.6302	8	7	1.7575	11	8	2.0158
7	5	2.0158	10	6	2.0158	11	3	2.0158	10	2	2.0158	10	3	2.0158
5	1	2.0158	6	1	2.0158	7	2	2.0158	10	5	2.2747	7	6	2.3349

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

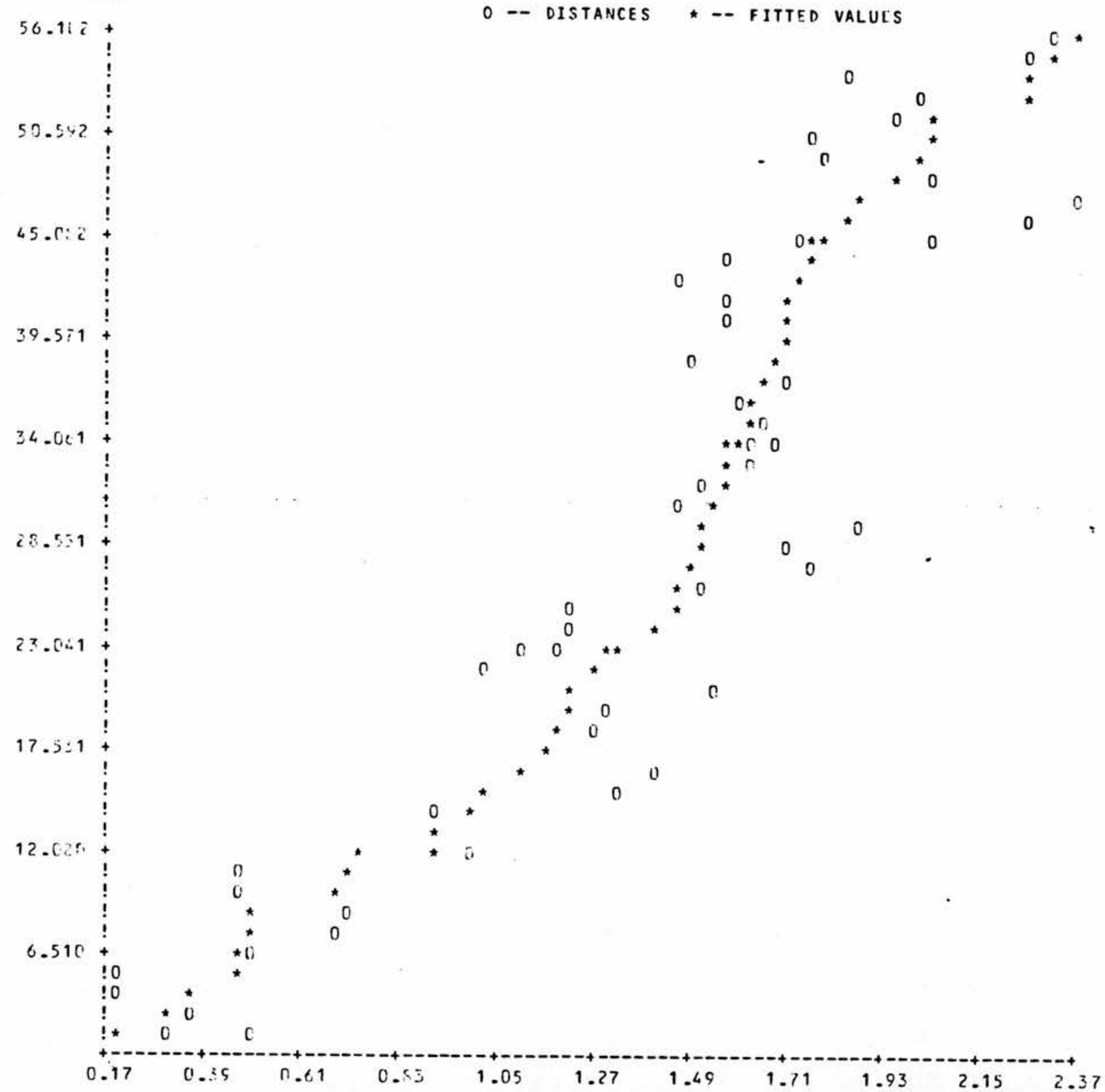
7	1	0.1738	11	2	0.1951	10	1	0.3126	10	7	0.3634	8	3	0.4518
6	5	0.4787	5	2	0.4849	11	9	0.4952	4	3	0.6944	8	4	0.7267
9	1	0.7463	9	7	0.9033	9	2	0.9063	10	9	0.9951	6	3	1.0092
3	1	1.0967	8	6	1.1722	9	4	1.1757	4	2	1.2048	2	1	1.2158
6	4	1.2596	6	2	1.2861	11	5	1.3202	4	1	1.4192	5	4	1.4688
8	5	1.4783	3	2	1.4861	8	2	1.5102	10	8	1.5255	7	4	1.5495
8	1	1.5683	7	3	1.5764	5	3	1.5889	9	8	1.6174	9	3	1.6286
11	10	1.6332	11	7	1.6631	9	5	1.6973	9	6	1.7065	10	4	1.7100
11	6	1.7208	11	1	1.7575	11	4	1.7641	8	7	1.7672	11	8	1.7877
7	5	1.8439	10	6	1.8809	11	3	1.9698	10	2	2.0271	10	3	2.0357
5	1	2.0602	6	1	2.2747	7	2	2.2920	10	5	2.3342	7	6	2.3683

==============

OK2 .

KOWARERU

SIMILARITY



10

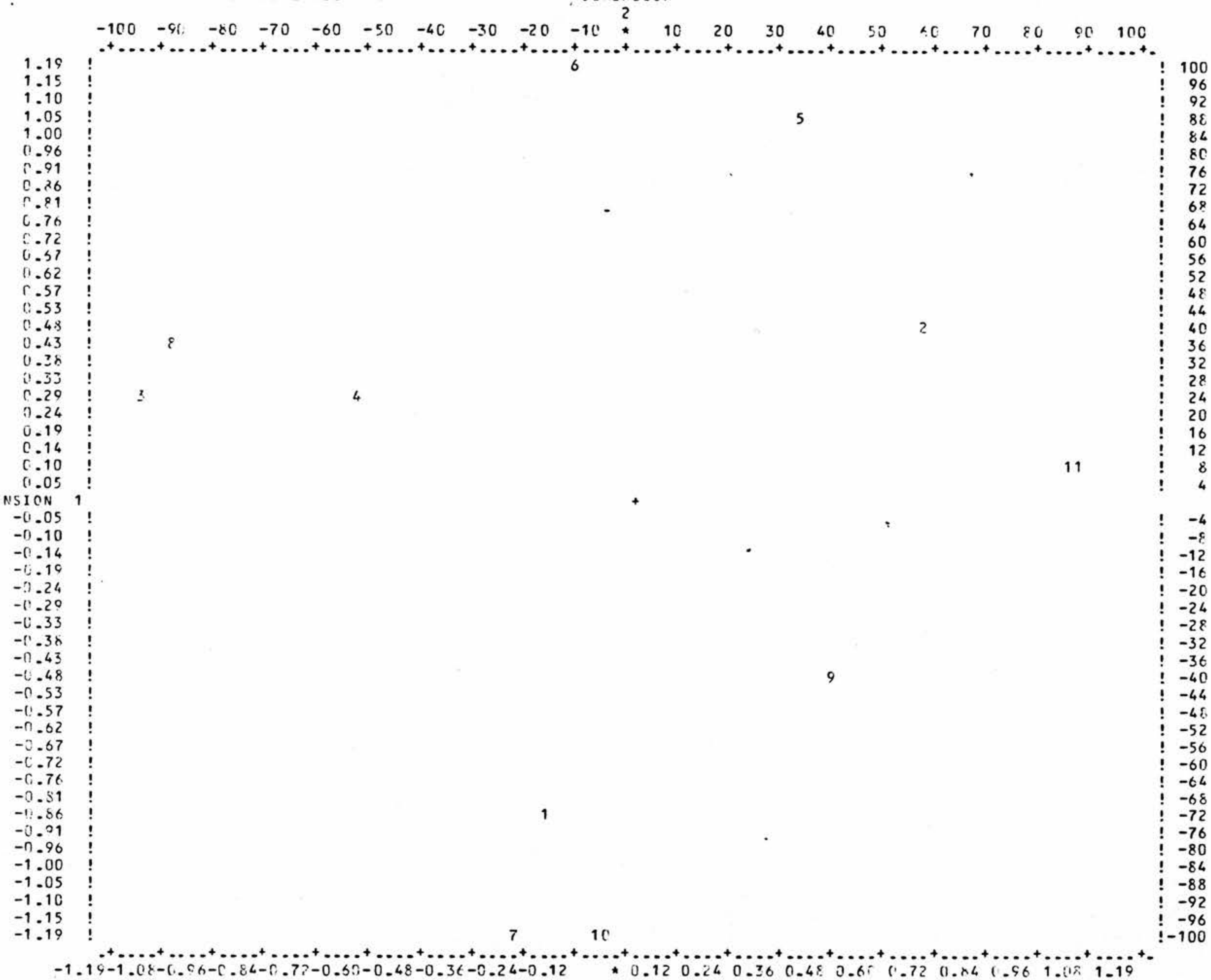
718

10K2

KOWAFERU

FINAL CONFIGURATION

DIMENSION 2 PLOTTED AGAINST DIMENSION 1



1

10 FINISH

719

//

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+-----------------------------------------------------------------------------------+
!                                  M  D  S  (X)  PROGRAMS                            !
!                                                                                   !
!     AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND !
!     LANGUAGE.                                                                     !
!                                                                                   !
!     PROGRAMS AND SUPPORTING DOCUMENTATION       OTHER ENQUIRIES SHOULD            !
!     ARE DISTRIBUTED FROM                        BE ADDRESSED TO                   !
!                                                                                   !
!     MDS(X) PROJECT,                             MDS(X) PROJECT,                   !
!     PROGRAM LIBRARY UNIT,                       SOCIOLOGICAL RESEARCH UNIT,       !
!     UNIVERSITY OF EDINBURGH,                    UNIVERSITY COLLEGE,               !
!     18 BUCCLEUCH PLACE,                         P.O. BOX 78,                      !
!     EDINBURGH EH8 9LN,                          CARDIFF CF1 1XL,                  !
!     U.K.                                        U.K.                              !
!                                                                                   !
!     USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN  !
!     PUBLISHING RESULTS.                                                           !
!                                                                                   !
+-----------------------------------------------------------------------------------+

      1.      RUN NAME        KOU1
      2.      TASK NAME        KOWARERU
      3.      £ OF STIMULI     11
      4.      PRINT DATA       YES
      5.      PARAMETERS       DATA TYPE(1),MINKOWSKI(2.0)
      6.      DIMENSION        2 TO 5
      7.      INPUT FORMAT     (10F5.0)
      8.      READ MATRIX

ROW   2  0.3850E+02

ROW   3  0.3250E+02  0.2100E+02

ROW   4  0.1750E+02  0.3250E+02  0.8000E+01

ROW   5  0.4900E+02  0.1100E+02  0.3250E+02  0.3500E+02

ROW   6  0.5300E+02  0.1600E+02  0.1300E+02  0.2250E+02  0.1000E+02

ROW   7  0.1000E+01  0.4450E+02  0.3250E+02  0.1750E+02  0.5100E+02  0.5450E+02

ROW   8  0.2700E+02  0.2700E+02  0.6000E+01  0.9000E+01  0.2700E+02  0.1950E+02
         0.4450E+02

ROW   9  0.1200E+02  0.7000E+01  0.4050E+02  0.2700E+02  0.2700E+02  0.4450E+02
         0.1400E+02  0.3650E+02

ROW  10  0.3000E+01  0.3850E+02  0.4450E+02  0.3650E+02  0.5200E+02  0.5450E+02
         0.2000E+01  0.4450E+02  0.1500E+02

ROW  11  0.2700E+02  0.5000E+01  0.4450E+02  0.5000E+02  0.1950E+02  0.4050E+02
         0.2700E+02  0.4800E+02  0.4000E+01  0.2250E+02

   10 ROWS ARE READ.
      9.      COMPUTE
1OU1                                                    KOWARERU
```

720

2

```
SOLUTION IN  3 DIMENSIONS:
 *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM  DESCRIPTION)

RAW STRESS DHAT       =      0.021220
STRESS DHAT           =      0.013243
RAW STRESS DSTAR      =      0.043824
COEF. ALIEN. DSTAR    =      0.019030


STRESS1 BASED ON APPROXIMATION TO RANDOM DATA  (SPENCE,MBR 1979 V14) =      0.138224

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION   2
OPTIMAL SOLUTION USING DHAT  WAS REACHED AFTER ITERATION 102
```

F I N A L   C O N F I G U R A T I O N

1	0.9318	0.1665	-0.2681
2	-0.2144	-0.7095	0.3345
3	-0.4127	0.8204	0.2116
4	-0.1254	0.8681	0.0824
5	-0.8267	-0.3120	-0.7021
6	-1.1965	-0.1076	-0.3406
7	0.9941	0.1849	-0.1605
8	-0.3606	0.7856	0.4355
9	0.1295	-0.6894	0.3799
10	1.0890	-0.0601	-0.2745
11	-0.0081	-0.9469	0.3019
OMEAN	0.0000	0.0000	0.0000
OSIGMA	0.7094	0.6100	0.3530

DISTANCES

7	1	0.1257	10	7	0.2864	10	1	0.2759	11	9	0.3023	11	2	0.3161
8	3	0.2325	9	2	0.3476	4	3	0.3186	8	4	0.4321	6	5	0.5561
5	2	1.2678	9	1	1.3402	6	3	1.3343	9	7	1.3431	10	9	1.3209
6	2	1.3351	4	1	1.3163	7	4	1.3339	11	5	1.4426	8	6	1.4487
3	2	1.5476	6	4	1.5093	11	10	1.5239	9	5	1.4925	8	2	1.5056
11	1	1.5646	11	7	1.5809	8	1	1.5964	9	4	1.6060	8	5	1.6480
5	3	1.5127	3	1	1.5701	7	3	1.5879	4	2	1.6001	5	4	1.5811
9	8	1.5552	10	4	1.5696	2	1	1.5634	10	2	1.5784	11	6	1.5904
9	3	1.6130	7	2	1.5829	8	7	1.5973	9	6	1.6174	10	3	1.8073
11	3	1.8152	10	8	1.8222	11	8	1.7730	5	1	1.8733	11	4	1.8320
7	5	1.9636	10	5	1.9789	6	1	2.1470	7	6	2.2174	10	6	2.2869

722

OU1 KOWARERU

3

FITTED VALUES

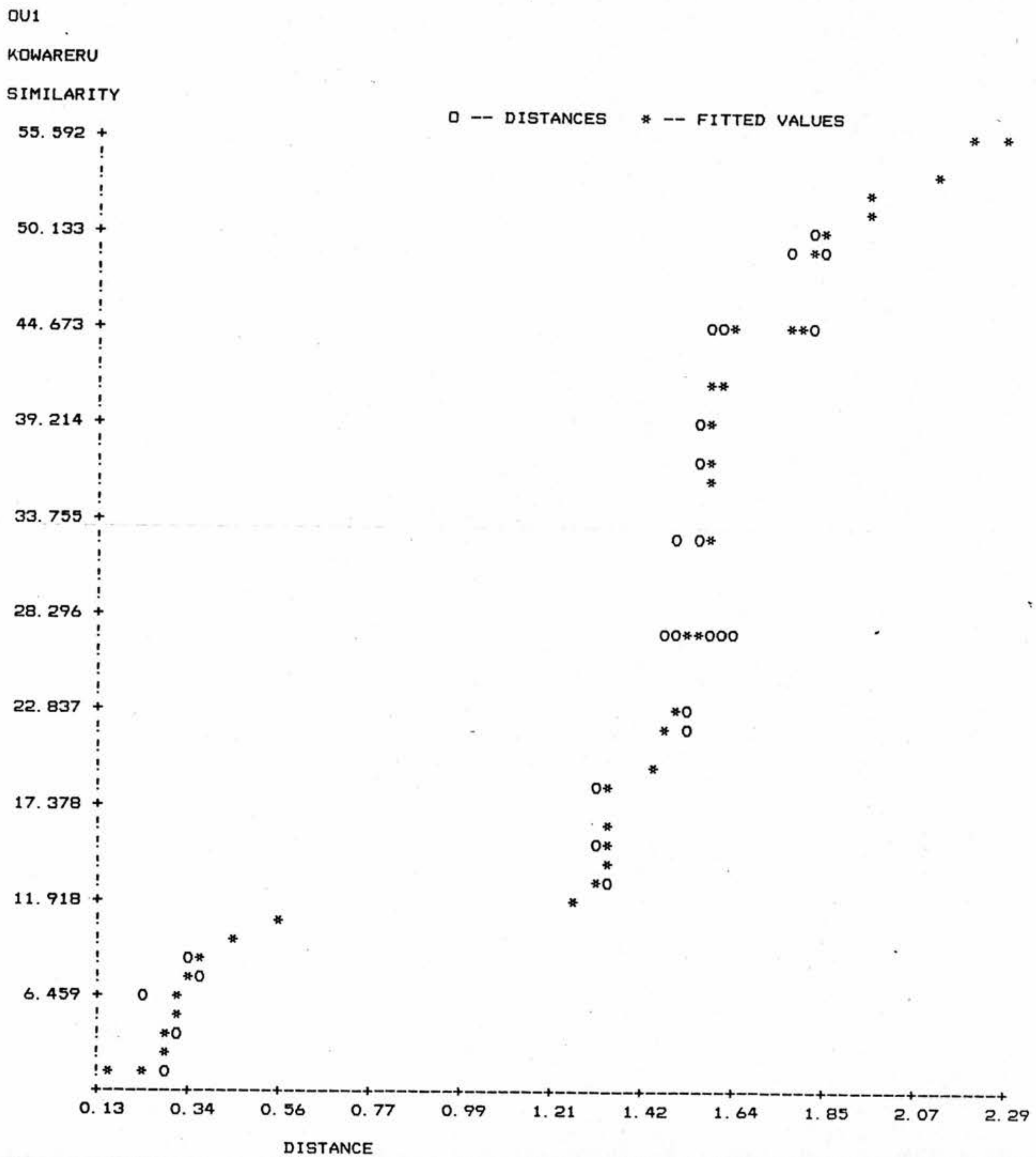
PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1257	10	7	0.2811	10	1	0.2811	11	9	0.2836	11	2	0.2836
8	3	0.2836	9	2	0.3331	4	3	0.3331	8	4	0.4321	6	5	0.5561
5	2	1.2678	9	1	1.3316	6	3	1.3316	9	7	1.3316	10	9	1.3316
6	2	1.3316	4	1	1.3316	7	4	1.3339	11	5	1.4426	8	6	1.4487
3	2	1.5158	6	4	1.5158	11	10	1.5158	9	5	1.5158	8	2	1.5158
11	1	1.5646	11	7	1.5808	8	1	1.5808	9	4	1.5808	8	5	1.5808
5	3	1.5808	3	1	1.5808	7	3	1.5808	4	2	1.5808	5	4	1.5808
9	8	1.5808	10	4	1.5808	2	1	1.5808	10	2	1.5808	11	6	1.5904
9	3	1.5977	7	2	1.5977	8	7	1.5977	9	6	1.6174	10	3	1.8044
11	3	1.8044	10	8	1.8044	11	8	1.8044	5	1	1.8527	11	4	1.8527
7	5	1.9636	10	5	1.9789	6	1	2.1470	7	6	2.2174	10	6	2.2869

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1257	10	7	0.2325	10	1	0.2759	11	9	0.2864	11	2	0.3023
8	3	0.3161	9	2	0.3186	4	3	0.3476	8	4	0.4321	6	5	0.5561
5	2	1.2678	9	1	1.3163	6	3	1.3209	9	7	1.3339	10	9	1.3343
6	2	1.3351	4	1	1.3402	7	4	1.3431	11	5	1.4426	8	6	1.4487
3	2	1.4925	6	4	1.5056	11	10	1.5093	9	5	1.5127	8	2	1.5239
11	1	1.5476	11	7	1.5552	8	1	1.5634	9	4	1.5646	8	5	1.5696
5	3	1.5701	3	1	1.5784	7	3	1.5809	4	2	1.5811	5	4	1.5829
9	8	1.5879	10	4	1.5904	2	1	1.5964	10	2	1.5973	11	6	1.6001
9	3	1.6060	7	2	1.6130	8	7	1.6174	9	6	1.6480	10	3	1.7730
11	3	1.8073	10	8	1.8152	11	8	1.8222	5	1	1.8320	11	4	1.8733
7	5	1.9636	10	5	1.9789	6	1	2.1470	7	6	2.2174	10	6	2.2869

4

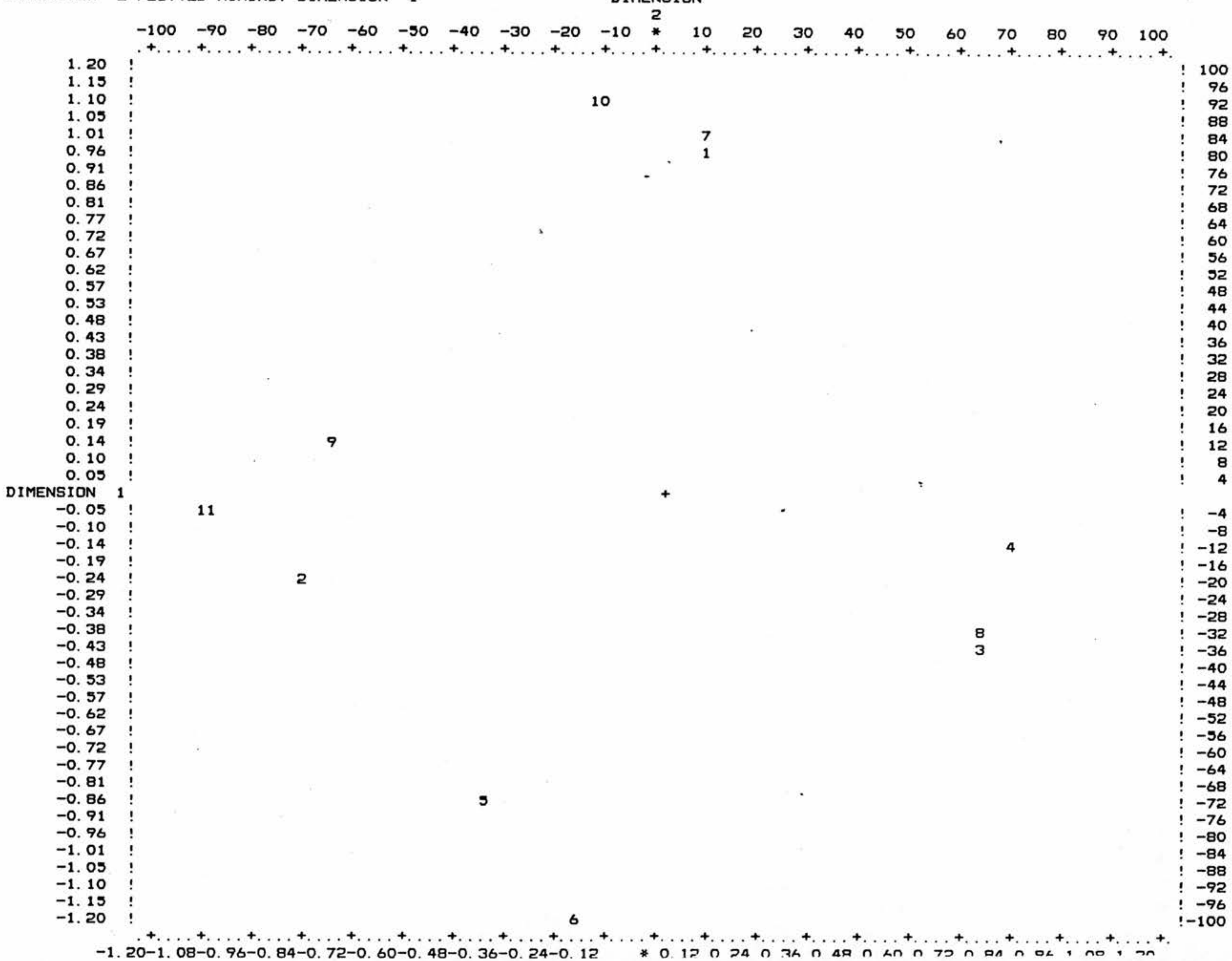


OU1
KOWARERU
SIMILARITY
O -- DISTANCES * -- FITTED VALUES
55.592
50.133
44.673
39.214
33.755
28.296
22.837
17.378
11.918
6.459
0.13
0.34
0.56
0.77
0.99
1.21
1.42
1.64
1.85
2.07
2.29
DISTANCE

10U1
FINAL CONFIGURATION
DIMENSION 2 PLOTTED AGAINST DIMENSION 1

KOWARERU

5



724

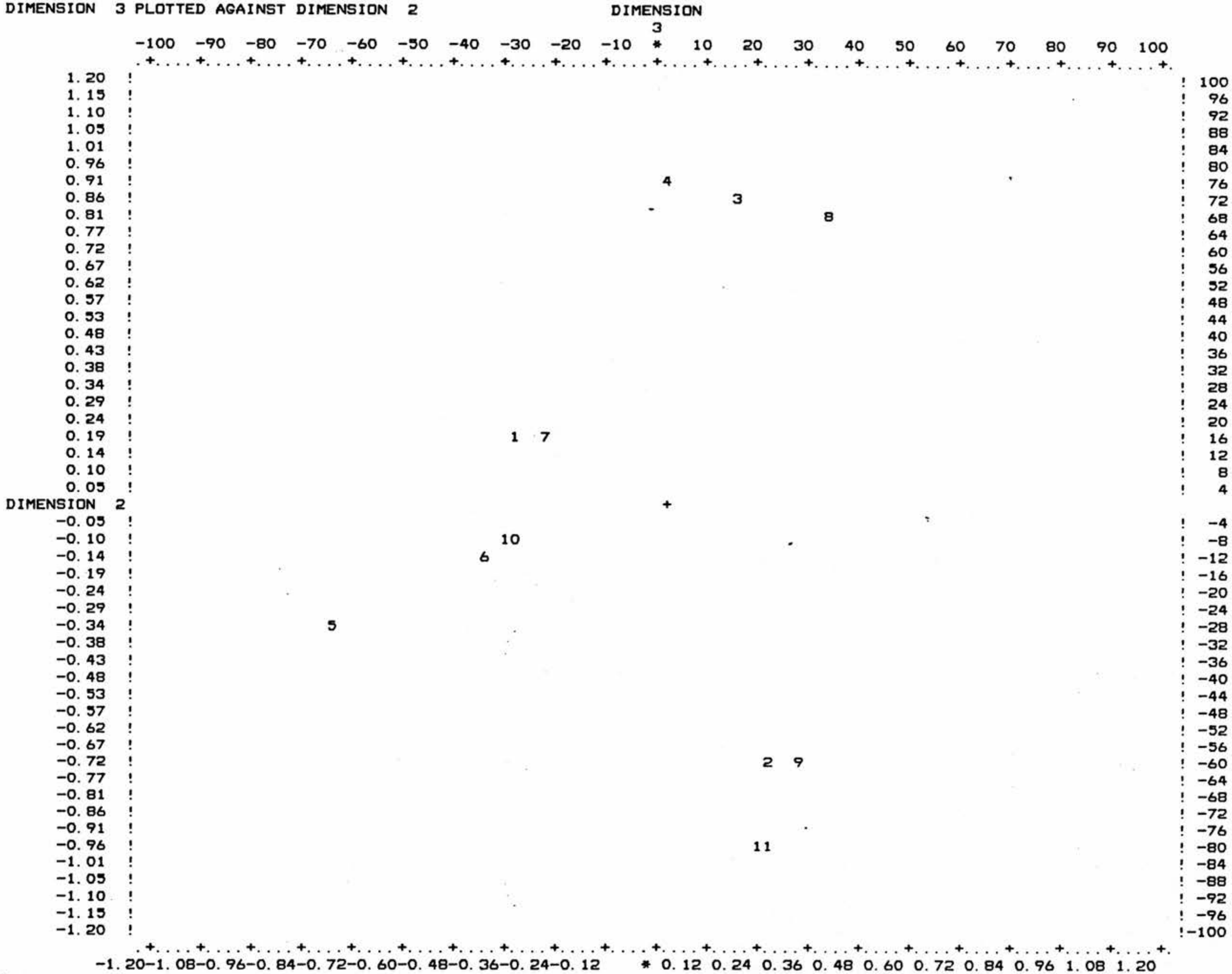
6

```
    FINAL CONFIGURATION
   DIMENSION  3 PLOTTED AGAINST DIMENSION  1                        DIMENSION
                                                               3
           -100  -90  -80  -70  -60  -50  -40  -30  -20  -10    *   10   20   30   40   50   60   70   80   90  100
            .+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+.
      1.20 !                                                                                                       ! 100
      1.15 !                                                                                                       !  96
      1.10 !                                    10                                                                 !  92
      1.05 !                                                                                                       !  88
      1.01 !                                        7                                                              !  84
      0.96 !                                     1                                                                 !  80
      0.91 !                                                                                                       !  76
      0.86 !                                                                                                       !  72
      0.81 !                                                                                                       !  68
      0.77 !                                                                                                       !  64
      0.72 !                                                                                                       !  60
      0.67 !                                                                                                       !  56
      0.62 !                                                                                                       !  52
      0.57 !                                                                                                       !  48
      0.53 !                                                                                                       !  44
      0.48 !                                                                                                       !  40
      0.43 !                                                                                                       !  36
      0.38 !                                                                                                       !  32
      0.34 !                                                                                                       !  28
      0.29 !                                                                                                       !  24
      0.24 !                                                                                                       !  20
      0.19 !                                                                                                       !  16
      0.14 !                                                                9                                      !  12
      0.10 !                                                                                                       !   8
      0.05 !                                                                                                       !   4
DIMENSION  1                                                   +
     -0.05 !                                                            11                                         !  -4
     -0.10 !                                                                                                       !  -8
     -0.14 !                                                   4                                                   ! -12
     -0.19 !                                                                                                       ! -16
     -0.24 !                                                             2                                         ! -20
     -0.29 !                                                                                                       ! -24
     -0.34 !                                                                                                       ! -28
     -0.38 !                                                                   8                                   ! -32
     -0.43 !                                                          3                                            ! -36
     -0.48 !                                                                                                       ! -40
     -0.53 !                                                                                                       ! -44
     -0.57 !                                                                                                       ! -48
     -0.62 !                                                                                                       ! -52
     -0.67 !                                                                                                       ! -56
     -0.72 !                                                                                                       ! -60
     -0.77 !                                                                                                       ! -64
     -0.81 !                                                                                                       ! -68
     -0.86 !                   5                                                                                   ! -72
     -0.91 !                                                                                                       ! -76
     -0.96 !                                                                                                       ! -80
     -1.01 !                                                                                                       ! -84
     -1.05 !                                                                                                       ! -88
     -1.10 !                                                                                                       ! -92
     -1.15 !                                                                                                       ! -96
     -1.20 !                                 6                                                                     !-100
            .+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+.
       -1.20-1.08-0.96-0.84-0.72-0.60-0.48-0.36-0.24-0.12     * 0.12 0.24 0.36 0.48 0.60 0.72 0.84 0.96 1.08 1.20
 10U1                                                             KOWARERU
```

725

7

FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 2



0 OK

726

8

727

SOLUTION IN 2 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

RAW STRESS DHAT = 0.168977
STRESS DHAT = 0.037370
RAW STRESS DSTAR = 0.403858
COEF. ALIEN. DSTAR = 0.057749

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE, MBR 1979 V14) = 0.170667

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 3
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 14

F I N A L C O N F I G U R A T I O N

1	0.9754	0.1563
2	-0.2539	-0.7065
3	-0.4189	0.7651
4	-0.0511	0.8791
5	-1.1015	-0.4220
6	-1.2572	0.0138
7	1.0450	0.1623
8	-0.3458	0.9082
9	0.1974	-0.6665
10	1.1880	-0.0972
11	0.0227	-0.9925
OMEAN	0.0000	0.0000
OSIGMA	0.7775	0.6288

OU1 KOWARERU

DISTANCES

7	1	0.0699	10	7	0.2962	10	1	0.3308	11	9	0.3699	11	2	0.3979
8	3	0.1607	9	2	0.4531	4	3	0.3851	8	4	0.2961	6	5	0.4629
5	2	0.8941	9	1	1.1324	6	3	1.1257	9	7	1.1855	10	9	1.1426
6	2	1.2351	4	1	1.2554	7	4	1.3097	11	5	1.2607	8	6	1.2769
3	2	1.4807	11	10	1.4695	6	4	1.4844	9	5	1.3217	11	1	1.4924
8	1	1.5201	8	5	1.5299	11	7	1.5423	9	4	1.5654	8	2	1.6172
5	3	1.3694	3	1	1.5213	7	3	1.5831	4	2	1.5985	5	4	1.6722
10	4	1.5774	9	8	1.6657	2	1	1.5018	10	2	1.5653	9	3	1.5586
11	6	1.6282	7	2	1.5626	8	7	1.5782	9	6	1.6058	11	3	1.8122
10	3	1.8236	10	8	1.8339	11	8	1.9361	5	1	2.1559	11	4	1.8730
7	5	2.2246	10	5	2.3124	6	1	2.2371	7	6	2.3070	10	6	2.4477

728

9

OU1

KOWARERU

FITTED VALUES

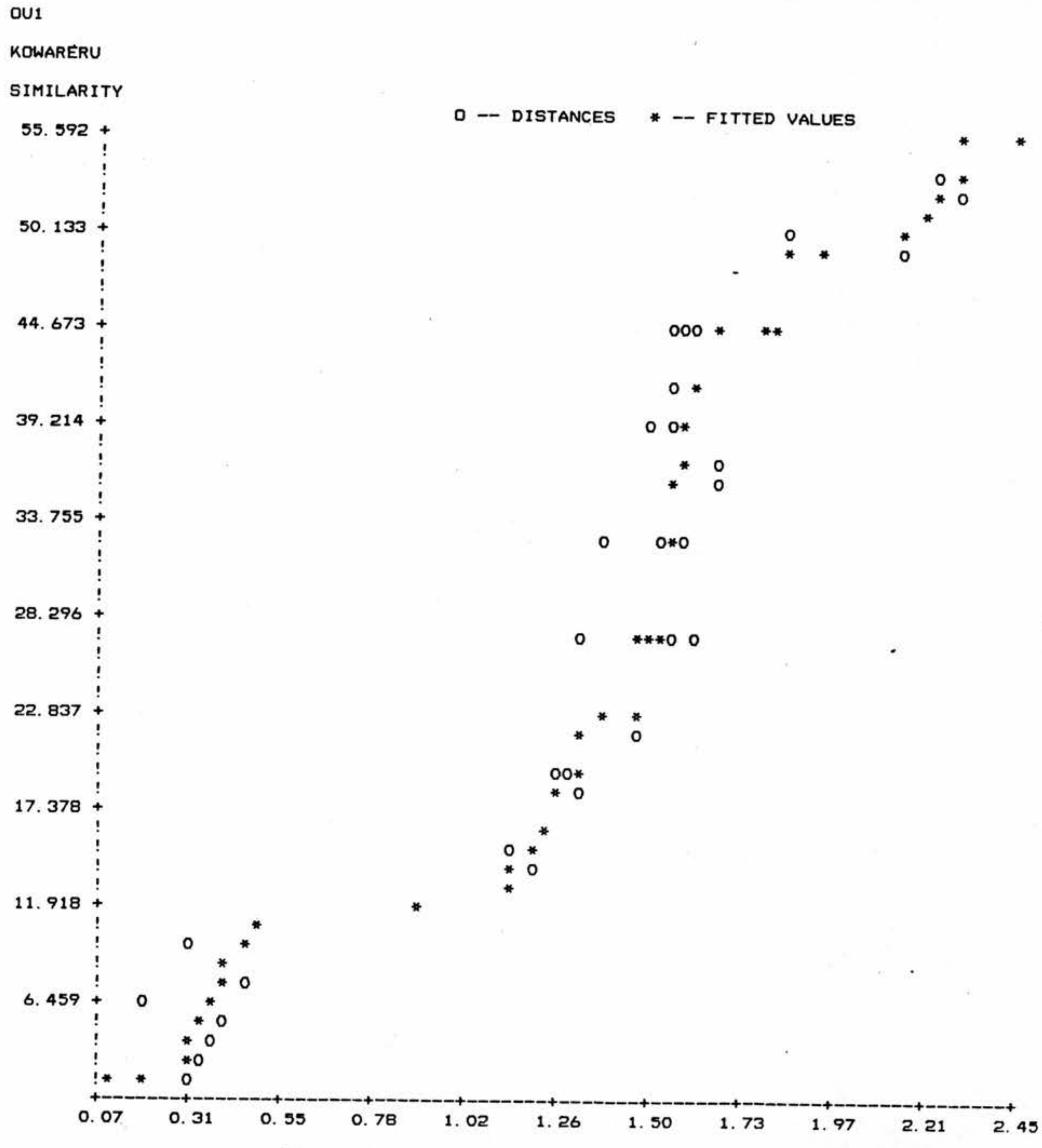
PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0699	10	7	0.2962	10	1	0.3148	11	9	0.3148	11	2	0.3148
8	3	0.3148	9	2	0.3781	4	3	0.3781	8	4	0.3781	6	5	0.4629
5	2	0.8941	9	1	1.1290	6	3	1.1290	9	7	1.1640	10	9	1.1640
6	2	1.2351	4	1	1.2554	7	4	1.2824	11	5	1.2824	8	6	1.2824
3	2	1.4391	11	10	1.4391	6	4	1.4391	9	5	1.4391	11	1	1.4924
8	1	1.5201	8	5	1.5243	11	7	1.5243	9	4	1.5243	8	2	1.5243
5	3	1.5243	3	1	1.5243	7	3	1.5831	4	2	1.5909	5	4	1.5909
10	4	1.5909	9	8	1.5909	2	1	1.5909	10	2	1.5909	9	3	1.5909
11	6	1.5909	7	2	1.5909	8	7	1.5909	9	6	1.6058	11	3	1.8122
10	3	1.8236	10	8	1.8339	11	8	1.9361	5	1	2.0145	11	4	2.0145
7	5	2.2246	10	5	2.2748	6	1	2.2748	7	6	2.3070	10	6	2.4477

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0699	10	7	0.1607	10	1	0.2961	11	9	0.2962	11	2	0.3308
8	3	0.3699	9	2	0.3851	4	3	0.3979	8	4	0.4531	6	5	0.4629
5	2	0.8941	9	1	1.1257	6	3	1.1324	9	7	1.1426	10	9	1.1855
6	2	1.2351	4	1	1.2554	7	4	1.2607	11	5	1.2769	8	6	1.3097
3	2	1.3217	11	10	1.3694	6	4	1.4695	9	5	1.4807	11	1	1.4844
8	1	1.4924	8	5	1.5018	11	7	1.5201	9	4	1.5213	8	2	1.5299
5	3	1.5423	3	1	1.5586	7	3	1.5626	4	2	1.5653	5	4	1.5654
10	4	1.5774	9	8	1.5782	2	1	1.5831	10	2	1.5985	9	3	1.6058
11	6	1.6172	7	2	1.6282	8	7	1.6657	9	6	1.6722	11	3	1.8122
10	3	1.8236	10	8	1.8339	11	8	1.8730	5	1	1.9361	11	4	2.1559
7	5	2.2246	10	5	2.2371	6	1	2.3070	7	6	2.3124	10	6	2.4477

10



OU1
KOWARERU
SIMILARITY
O -- DISTANCES * -- FITTED VALUES
55.592
50.133
44.673
39.214
33.755
28.296
22.837
17.378
11.918
6.459
0.07
0.31
0.55
0.78
1.02
1.26
1.50
1.73
1.97
2.21
2.45

729

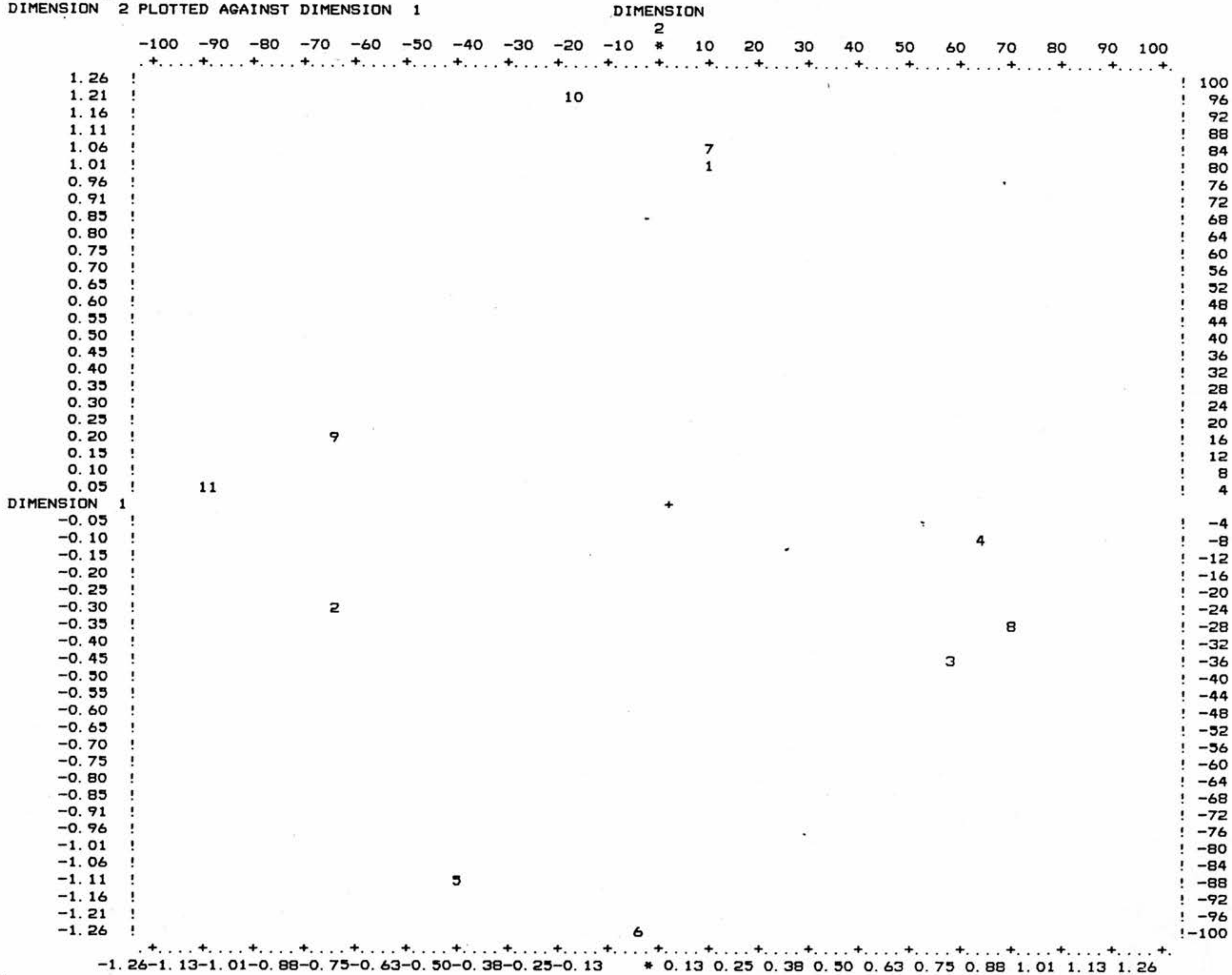
10U1

KOWARERU

//

FINAL CONFIGURATION

DIMENSION 2 PLOTTED AGAINST DIMENSION 1



730

1

10 FINISH

```
+------------------------------------------------------------------------------------------+
|                                   M  D  S  (X)  PROGRAMS                                  |
|                                                                                          |
|     AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND      |
|     LANGUAGE.                                                                            |
|                                                                                          |
|     PROGRAMS AND SUPPORTING DOCUMENTATION        OTHER ENQUIRIES SHOULD                  |
|     ARE DISTRIBUTED FROM                         BE ADDRESSED TO                         |
|                                                                                          |
|     MDS(X) PROJECT,                              MDS(X) PROJECT,                         |
|     PROGRAM LIBRARY UNIT,                        SOCIOLOGICAL RESEARCH UNIT,             |
|     UNIVERSITY OF EDINBURGH,                     UNIVERSITY COLLEGE,                     |
|     18 BUCCLEUCH PLACE,                          P.O. BOX 78,                            |
|     EDINBURGH EH8 9LN,                           CARDIFF CF1 1XL,                        |
|     U.K.                                         U.K.                                    |
|                                                                                          |
|     USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN         |
|     PUBLISHING RESULTS.                                                                  |
|                                                                                          |
+------------------------------------------------------------------------------------------+

 1.     RUN NAME        KOUN2
 2.     TASK NAME        KOWARERU
 3.     £ OF STIMULI     11
 4.     PRINT DATA       YES
 5.     PARAMETERS       DATA TYPE(1) MINKOWSKI(2.0)
 6.     DIMENSION         2 TO 5
 7.     INPUT FORMAT     (10F5.0)
 8.     READ MATRIX

ROW   2  0.3900E+02

ROW   3  0.3300E+02  0.2700E+02

ROW   4  0.1700E+02  0.2600E+02  0.1000E+02

ROW   5  0.5000E+02  0.1100E+02  0.2400E+02  0.3700E+02

ROW   6  0.5100E+02  0.1500E+02  0.1400E+02  0.2800E+02  0.8000E+01

ROW   7  0.1000E+01  0.4350E+02  0.2900E+02  0.2000E+02  0.5250E+02  0.5500E+02

ROW   8  0.3400E+02  0.3000E+02  0.7000E+01  0.9000E+01  0.2500E+02  0.1900E+02
         0.4100E+02

ROW   9  0.1200E+02  0.6000E+01  0.3500E+02  0.3200E+02  0.2200E+02  0.4800E+Q2
         0.1300E+02  0.3600E+02

ROW  10  0.3000E+01  0.3800E+02  0.4000E+02  0.4700E+02  0.5250E+02  0.5400E+02
         0.4000E+01  0.4500E+02  0.1800E+02

ROW  11  0.2300E+02  0.5000E+01  0.4600E+02  0.4900E+02  0.1600E+02  0.4200E+02
         0.3100E+02  0.4350E+02  0.2000E+01  0.2100E+02

  10 ROWS ARE READ.
 9.     COMPUTE
```

731

1OUN2 KOWARERU

2

SOLUTION IN 3 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

RAW STRESS DHAT = 0.001070
STRESS DHAT = 0.002974
RAW STRESS DSTAR = 0.003209
COEF. ALIEN. DSTAR = 0.005150

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.138224

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 97
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 197

FINAL CONFIGURATION

1	1.1220	0.0203	-0.0040
2	-0.1787	-0.7085	0.0632
3	-0.1361	0.7441	-0.1291
4	-0.1003	0.7271	0.2472
5	-1.3372	-0.0676	-0.0190
6	-1.3544	0.0407	-0.1157
7	1.1400	0.0130	-0.0030
8	-0.1447	0.7575	0.0180
9	-0.0566	-0.7322	0.0996
10	1.1461	-0.0292	-0.1309
11	-0.1000	-0.7652	-0.0264
DMEAN	0.0000	0.0000	0.0000
DSIGMA	0.8306	0.5467	0.1060

OUN2 KOWARERU

DISTANCES

7	1	0.0195	11	9	0.1373	10	1	0.1383	10	7	0.1347	11	2	0.1321
9	2	0.1296	8	3	0.1479	6	5	0.1461	8	4	0.2354	4	3	0.3783
5	2	1.3266	9	1	1.4022	9	7	1.4134	6	3	1.4068	6	2	1.4055
11	5	1.4204	4	1	1.4341	10	9	1.4121	8	6	1.4124	7	4	1.4529
11	10	1.4510	9	5	1.4477	11	1	1.4528	5	3	1.4538	8	5	1.4506
4	2	1.4494	3	2	1.4658	6	4	1.4749	7	3	1.4761	8	2	1.4670
11	7	1.4641	9	4	1.4674	3	1	1.4568	8	1	1.4657	9	3	1.4960
9	8	1.4945	5	4	1.4941	10	2	1.5014	2	1	1.4924	10	3	1.4974
8	7	1.4850	11	6	1.4936	7	2	1.5046	11	8	1.5239	10	8	1.5189
11	3	1.5132	10	4	1.5061	9	6	1.5257	11	4	1.5171	5	1	2.4608
6	1	2.4789	7	5	2.4786	10	5	2.4862	10	6	2.5015	7	6	2.4971

733

OUN2 KOWARERU 3

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0195	11	9	0.1344	10	1	0.1344	10	7	0.1344	11	2	0.1344
9	2	0.1344	8	3	0.1470	6	5	0.1470	8	4	0.2354	4	3	0.3783
5	2	1.3266	9	1	1.4022	9	7	1.4086	6	3	1.4086	6	2	1.4086
11	5	1.4197	4	1	1.4197	10	9	1.4197	8	6	1.4197	7	4	1.4505
11	10	1.4505	9	5	1.4505	11	1	1.4516	5	3	1.4516	8	5	1.4516
4	2	1.4516	3	2	1.4658	6	4	1.4674	7	3	1.4674	8	2	1.4674
11	7	1.4674	9	4	1.4674	3	1	1.4674	8	1	1.4674	9	3	1.4943
9	8	1.4943	5	4	1.4943	10	2	1.4943	2	1	1.4943	10	3	1.4943
8	7	1.4943	11	6	1.4943	7	2	1.5046	11	8	1.5155	10	8	1.5155
11	3	1.5155	10	4	1.5155	9	6	1.5214	11	4	1.5214	5	1	2.4608
6	1	2.4788	7	5	2.4788	10	5	2.4862	10	6	2.4993	7	6	2.4993

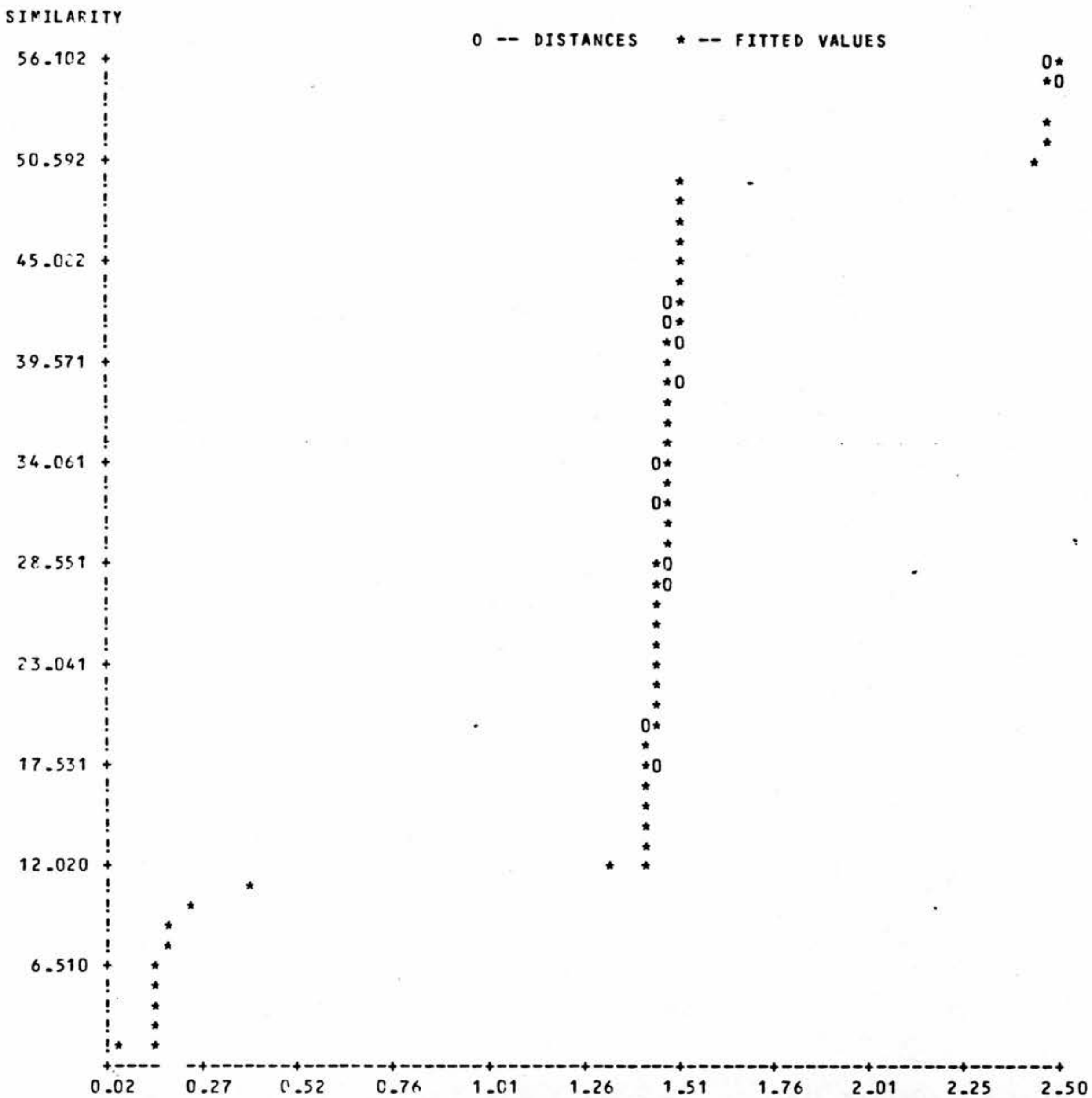
PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0195	11	9	0.1296	10	1	0.1321	10	7	0.1347	11	2	0.1373
9	2	0.1383	8	3	0.1461	6	5	0.1479	8	4	0.2354	4	3	0.3783
5	2	1.3266	9	1	1.4022	9	7	1.4055	6	3	1.4068	6	2	1.4121
11	5	1.4124	4	1	1.4134	10	9	1.4204	8	6	1.4341	7	4	1.4477
11	10	1.4494	9	5	1.4506	11	1	1.4510	5	3	1.4528	8	5	1.4529
4	2	1.4538	3	2	1.4568	6	4	1.4641	7	3	1.4657	8	2	1.4658
11	7	1.4670	9	4	1.4674	3	1	1.4749	8	1	1.4761	9	3	1.4850
9	8	1.4924	5	4	1.4936	10	2	1.4941	2	1	1.4945	10	3	1.4960
8	7	1.4974	11	6	1.5014	7	2	1.5046	11	8	1.5061	10	8	1.5132
11	3	1.5171	10	4	1.5189	9	6	1.5239	11	4	1.5257	5	1	2.4608
6	1	2.4786	7	5	2.4789	10	5	2.4862	10	6	2.4971	7	6	2.5015

4

OUN2.

KOWARERU

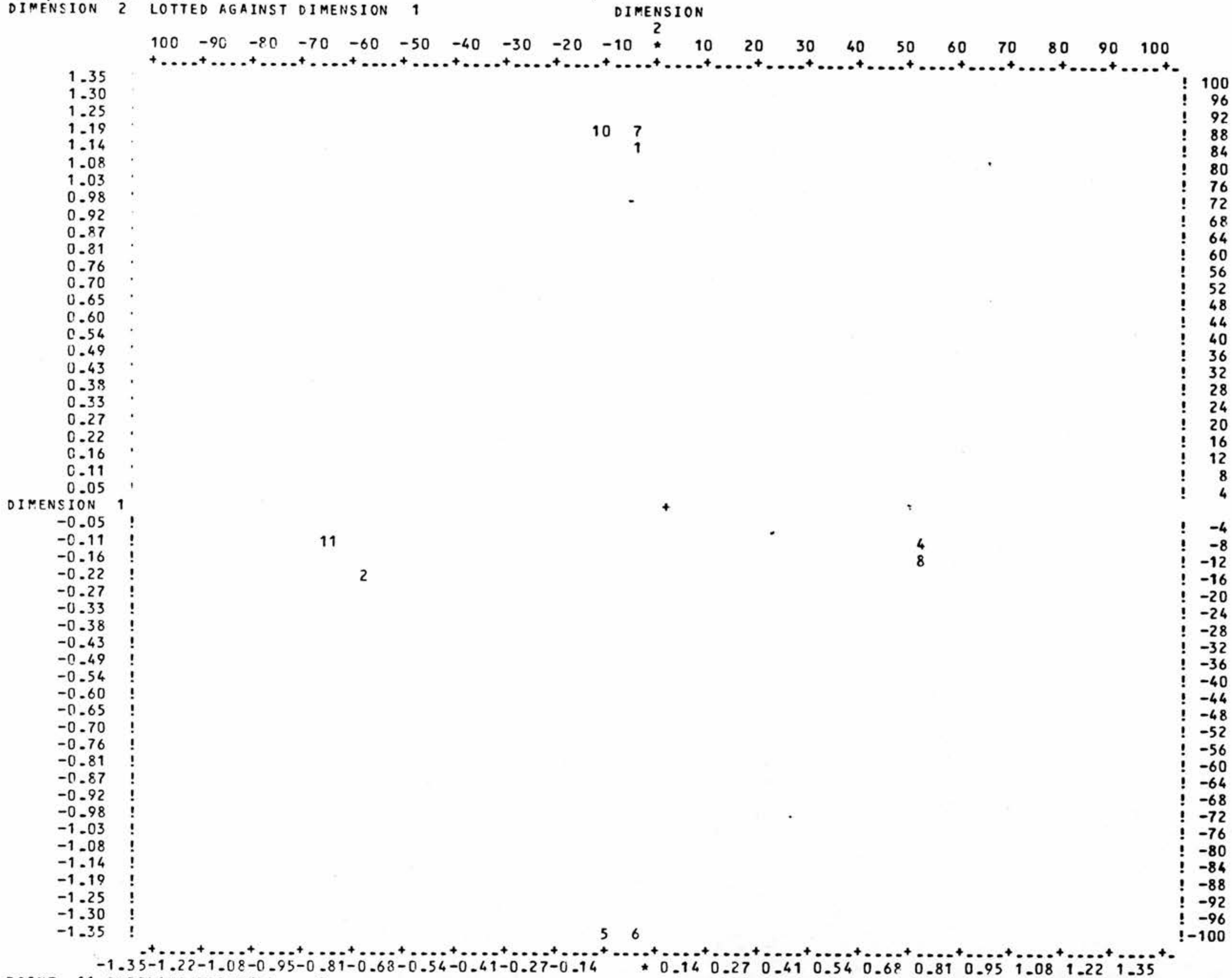


734

1OUN2
FINAL CONFI(RATION
DIMENSION 2 LOTTED AGAINST DIMENSION 1

KOWARERU

5



POINT 11 OVERLAYS POINT(S)

735

6

```
10UN2                                                              KOWARERU
  FINAL CONFIGURATION
 DIMENSION  3 PLOTTED AGAINST DIMENSION  1                      DIMENSION
                                                                    3
                -100  -90  -80  -70  -60  -50  -40  -30  -20  -10   *   10   20   30   40   50   60   70   80   90  100
                .+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+.
        1.35   !                                                                                                      ! 100
        1.30   !                                                                                                      !  96
        1.25   !                                                                                                      !  92
        1.19   !                                          10   7                                                      !  88
        1.14   !                                               1                                                      !  84
        1.08   !                                                                                                      !  80
        1.03   !                                                                                                      !  76
        0.98   !                                                                                                      !  72
        0.92   !                                                                                                      !  68
        0.87   !                                                                                                      !  64
        0.81   !                                                                                                      !  60
        0.76   !                                                                                                      !  56
        0.70   !                                                                                                      !  52
        0.65   !                                                                                                      !  48
        0.60   !                                                                                                      !  44
        0.54   !                                                                                                      !  40
        0.49   !                                                                                                      !  36
        0.43   !                                                                                                      !  32
        0.38   !                                                                                                      !  28
        0.33   !                                                                                                      !  24
        0.27   !                                                                                                      !  20
        0.22   !                                                                                                      !  16
        0.16   !                                                                                                      !  12
        0.11   !                                                                                                      !   8
        0.05   !                                                                                                      !   4
 DIMENSION  1                                                       +
       -0.05   !                                                                                                      !  -4
       -0.11   !                                              11             4                                        !  -8
       -0.16   !                                                  8                                                   ! -12
       -0.22   !                                                  2                                                   ! -16
       -0.27   !                                                                                                      ! -20
       -0.33   !                                                                                                      ! -24
       -0.38   !                                                                                                      ! -28
       -0.43   !                                                                                                      ! -32
       -0.49   !                                                                                                      ! -36
       -0.54   !                                                                                                      ! -40
       -0.60   !                                                                                                      ! -44
       -0.65   !                                                                                                      ! -48
       -0.70   !                                                                                                      ! -52
       -0.76   !                                                                                                      ! -56
       -0.81   !                                                                                                      ! -60
       -0.87   !                                                                                                      ! -64
       -0.92   !                                                                                                      ! -68
       -0.98   !                                                                                                      ! -72
       -1.03   !                                                                                                      ! -76
       -1.08   !                                                                                                      ! -80
       -1.14   !                                                                                                      ! -84
       -1.19   !                                                                                                      ! -88
       -1.25   !                                                                                                      ! -92
       -1.30   !                                                                                                      ! -96
       -1.35   !                                          6    5                                                      !-100
                +....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+.
           -1.3 -1.22-1.08-0.95-0.81-0.68-0.54-0.41-0.27-0.14     * 0.14 0.27 0.41 0.54 0.68 0.81 0.95 1.08 1.22 1.35
```

7

```
FINAL CONFIG RATION
DIMENSION  3  LOTTED AGAINST DIMENSION  2                     DIMENSION
                                                                  3
             100 -90  -80  -70  -60  -50  -40  -30  -20  -10   *   10   20   30   40   50   60   70   80   90  100
             +....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+.
       1.35 !                                                                                                     ! 100
       1.30 !                                                                                                     !  96
       1.25 !                                                                                                     !  92
       1.19 !                                                                                                     !  88
       1.14 !                                                                                                     !  84
       1.08 !                                                                                                     !  80
       1.03 !                                                                                                     !  76
       0.98 !                                                                                                     !  72
       0.92 !                                                                                                     !  68
       0.87 !                                                                                                     !  64
       0.81 !                                                                                                     !  60
       0.76 !                                         3     8         4                                           !  56
       0.70 !                                                                                                     !  52
       0.65 !                                                                                                     !  48
       0.60 !                                                                                                     !  44
       0.54 !                                                                                                     !  40
       0.49 !                                                                                                     !  36
       0.43 !                                                                                                     !  32
       0.38 !                                                                                                     !  28
       0.33 !                                                                                                     !  24
       0.27 !                                                                                                     !  20
       0.22 !                                                                                                     !  16
       0.16 !                                                                                                     !  12
       0.11 !                                                                                                     !   8
       0.05 !                                         6  7                                                        !   4
DIMENSION  2                                                 +
      -0.05 !                                        10                                                           !  -4
      -0.11 !                                            5                                                        !  -8
      -0.16 !                                                                                                     ! -12
      -0.22 !                                                                                                     ! -16
      -0.27 !                                                                                                     ! -20
      -0.33 !                                                                                                     ! -24
      -0.38 !                                                                                                     ! -28
      -0.43 !                                                                                                     ! -32
      -0.49 !                                                                                                     ! -36
      -0.54 !                                                                                                     ! -40
      -0.60 !                                                                                                     ! -44
      -0.65 !                                                                                                     ! -48
      -0.70 !                                                                                                     ! -52
      -0.76 !                                               2  9                                                  ! -56
      -0.81 !                                            11                                                       ! -60
      -0.87 !                                                                                                     ! -64
      -0.92 !                                                                                                     ! -68
      -0.98 !                                                                                                     ! -72
      -1.03 !                                                                                                     ! -76
      -1.08 !                                                                                                     ! -80
      -1.14 !                                                                                                     ! -84
      -1.19 !                                                                                                     ! -88
      -1.25 !                                                                                                     ! -92
      -1.30 !                                                                                                     ! -96
      -1.35 !                                                                                                     !-100
             +....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+....+.
       -1.3 -1.22-1.08-0.95-0.81-0.68-0.54-0.41-0.27-0.14      * 0.14 0.27 0.41 0.54 0.68 0.81 0.95 1.08 1.22 1.35
POINT    7 OVE LAYS POINT(S)    1
0          OK
```

737

8

```
SOLUTION IN     DIMENSIONS:
 *  *  *  *     *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

FIT= DSTAR; A ORITHM= SOFT SQUEEZE; (SEE PROGRAM  DESCRIPTION)

RAW STRESS DH T       =     0.000000
STRESS DHAT           =     0.000004
RAW STRESS DS AR      =     0.000000
COEF. ALIEN.  STAR    =     0.000005

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA  (SPENCE,MBR 1979 V14) =     0.170667

OPTIMAL SOLUT ON USING DSTAR WAS REACHED AFTER ITERATION  89
OPTIMAL SOLUT ON USING DHAT  WAS REACHED AFTER ITERATION  89
```

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```
F I N A L   C O N F I G U R A T I O N
     1      1.1 71       0.0000
     2     -0.1 47      -0.7285
     3     -0.1 47       0.7285
     4     -0.1 47       0.7285
     5     -1.3 65       0.0000
     6     -1.3 65       0.0000
     7      1.1 71       0.0000
     8     -0.1 47       0.7285
     9     -0.1 47      -0.7285
    10      1.1 71       0.0000
    11     -0.1 47      -0.7285
OMEAN     0.000        0.0000
OSIGMA    0.842        0.5380
```

OUN2 KOWARERU

DISTANCES

7	1	0.000	11	9	0.0000	10	1	0.0000	10	7	0.0000	11	2	0.0000
9	2	0.000	8	3	0.0000	6	5	0.0000	8	4	0.0000	4	3	0.0000
5	2	1.456	9	1	1.4570	9	7	1.4570	6	3	1.4570	6	2	1.4570
11	5	1.457	4	1	1.4570	10	9	1.4570	8	6	1.4570	7	4	1.4570
11	10	1.457	9	5	1.4570	11	1	1.4570	5	3	1.4570	8	5	1.4570
4	2	1.4570	3	2	1.4570	6	4	1.4570	7	3	1.4570	8	2	1.4570
11	7	1.4570	9	4	1.4570	3	1	1.4570	8	1	1.4570	9	3	1.4570
9	8	1.4570	5	4	1.4570	10	2	1.4570	2	1	1.4570	10	3	1.4570
8	7	1.4570	11	6	1.4570	7	2	1.4570	11	8	1.4570	10	8	1.4570
11	3	1.4570	10	4	1.4570	9	6	1.4570	11	4	1.4570	5	1	2.5235
6	1	2.5236	7	5	2.5236	10	5	2.5236	10	6	2.5236	7	6	2.5236

739

OUN2 KOWARERU 9

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0000	11	9	0.0000	10	1	0.0000	10	7	0.0000	11	2	0.0000
9	2	0.0000	8	3	0.0000	6	5	0.0000	8	4	0.0000	4	3	0.0000
5	2	1.4569	9	1	1.4570	9	7	1.4570	6	3	1.4570	6	2	1.4570
11	5	1.4570	4	1	1.4570	10	9	1.4570	8	6	1.4570	7	4	1.4570
11	10	1.4570	9	5	1.4570	11	1	1.4570	5	3	1.4570	8	5	1.4570
4	2	1.4570	3	2	1.4570	6	4	1.4570	7	3	1.4570	8	2	1.4570
11	7	1.4570	9	4	1.4570	3	1	1.4570	8	1	1.4570	9	3	1.4570
9	8	1.4570	5	4	1.4570	10	2	1.4570	2	1	1.4570	10	3	1.4570
8	7	1.4570	11	6	1.4570	7	2	1.4570	11	8	1.4570	10	8	1.4570
11	3	1.4570	10	4	1.4570	9	6	1.4570	11	4	1.4570	5	1	2.5235
6	1	2.5236	7	5	2.5236	10	5	2.5236	10	6	2.5236	7	6	2.5236

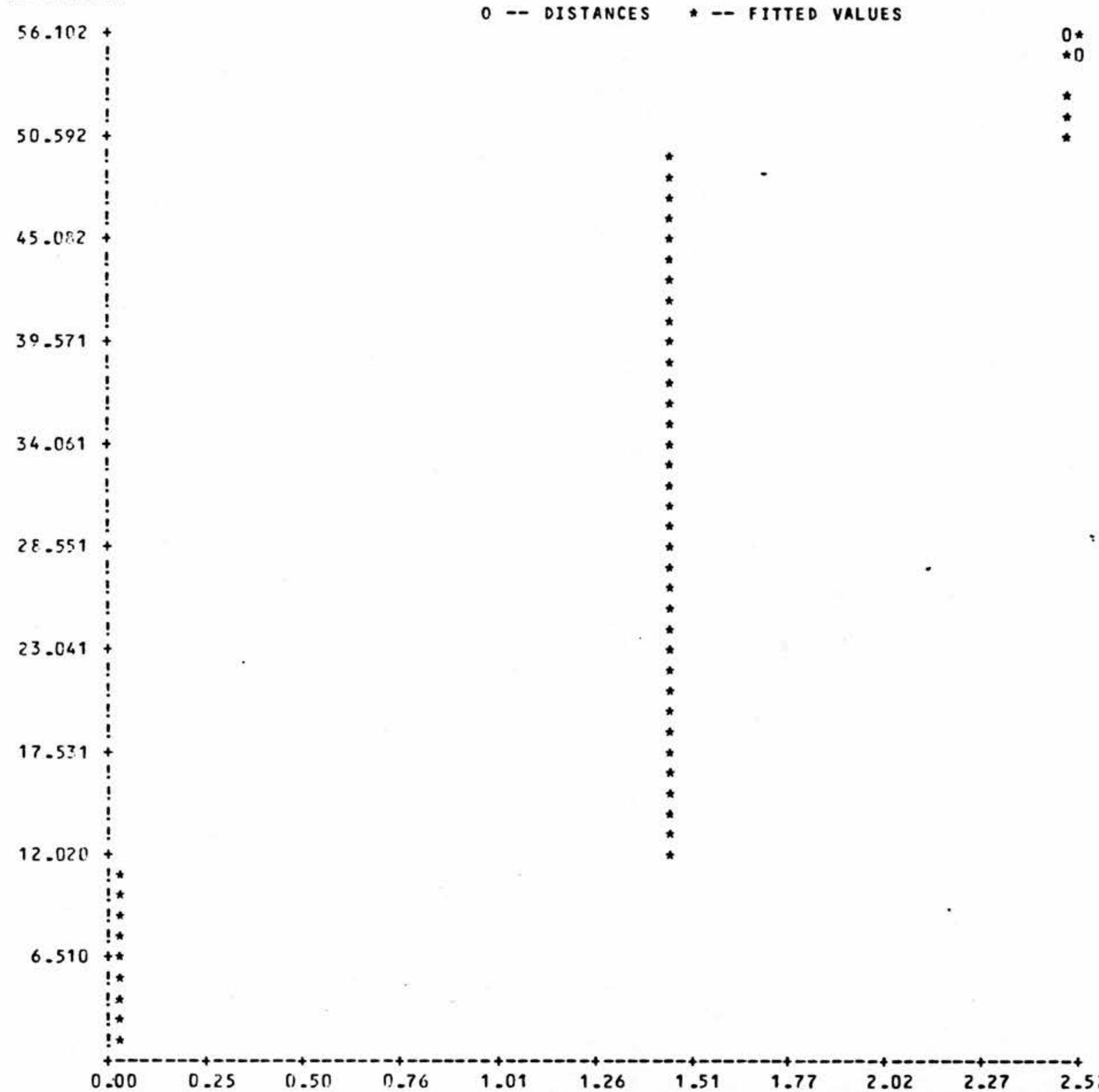
PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0000	11	9	0.0000	10	1	0.0000	10	7	0.0000	11	2	0.0000
9	2	0.0000	8	3	0.0000	6	5	0.0000	8	4	0.0000	4	3	0.0000
5	2	1.4569	9	1	1.4570	9	7	1.4570	6	3	1.4570	6	2	1.4570
11	5	1.4570	4	1	1.4570	10	9	1.4570	8	6	1.4570	7	4	1.4570
11	10	1.4570	9	5	1.4570	11	1	1.4570	5	3	1.4570	8	5	1.4570
4	2	1.4570	3	2	1.4570	6	4	1.4570	7	3	1.4570	8	2	1.4570
11	7	1.4570	9	4	1.4570	3	1	1.4570	8	1	1.4570	9	3	1.4570
9	8	1.4570	5	4	1.4570	10	2	1.4570	2	1	1.4570	10	3	1.4570
8	7	1.4570	11	6	1.4570	7	2	1.4570	11	8	1.4570	10	8	1.4570
11	3	1.4570	10	4	1.4570	9	6	1.4570	11	4	1.4570	5	1	2.5235
6	1	2.5236	7	5	2.5236	10	5	2.5236	10	6	2.5236	7	6	2.5236

OUN2

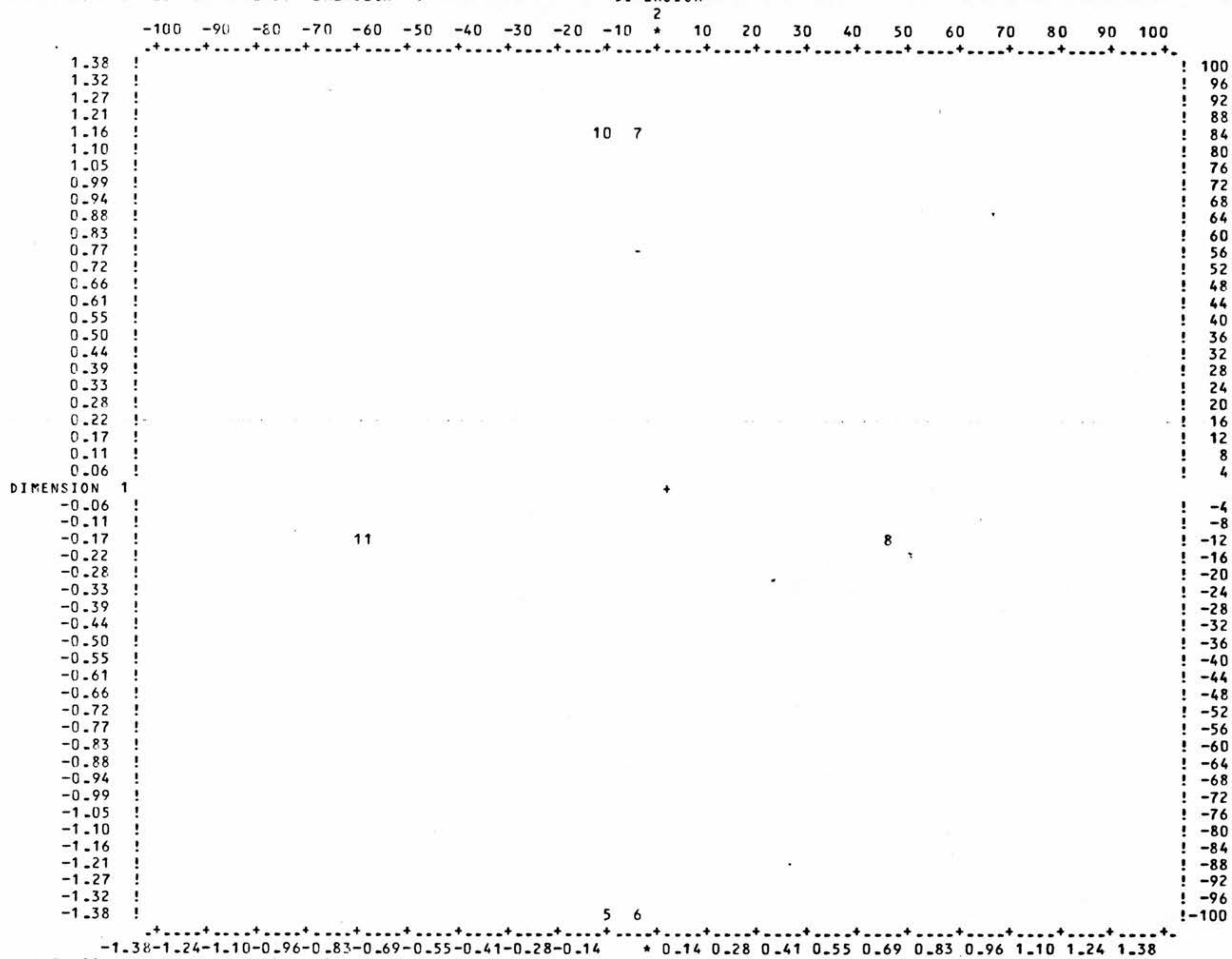
KOWARERU

SIMILARITY



740

70



POINT 11 OVERLAYS POINT(S) 9 2
POINT 8 OVERLAYS POINT(S) 4 3
POINT 7 OVERLAYS POINT(S) 1
1

```
M  D  S  (X)  PROGRAMS

AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND
LANGUAGE.

PROGRAMS AND SUPPORTING DOCUMENTATION        OTHER ENQUIRIES SHOULD
ARE DISTRIBUTED FROM                         BE ADDRESSED TO

MDS(X) PROJECT,                              MDS(X) PROJECT,
PROGRAM LIBRARY UNIT,                        SOCIOLOGICAL RESEARCH UNIT,
UNIVERSITY OF EDINBURGH,                     UNIVERSITY COLLEGE,
18 BUCCLEUCH PLACE,                          P.O. BOX 78,
EDINBURGH EH8 9LN,                           CARDIFF CF1 1XL,
U.K.                                         U.K.

USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN
PUBLISHING RESULTS.
```

```
1.    RUN NAME        KOC3
2.    TASK NAME       KOWARERU
3.    N OF STIMULI    11
4.    PRINT DATA      YES
5.    PARAMETERS      DATA(1), MINKOWSKI(12.0)
6.    DIMENSION       2 TO 5
7.    INPUT FORMAT    (10F5.0)
8.    READ MATRIX

ROW  2  0.2400E+02

ROW  3  0.1800E+02  0.2500E+02

ROW  4  0.2200E+02  0.1500E+02  0.9000E+01

ROW  5  0.5000E+02  0.6000E+01  0.2600E+02  0.2300E+02

ROW  6  0.5400E+02  0.2000E+02  0.1900E+02  0.2100E+02  0.1000E+02

ROW  7  0.1000E+01  0.4700E+02  0.3200E+02  0.2750E+02  0.3000E+02  0.5500E+02

ROW  8  0.4000E+02  0.3200E+02  0.5000E+01  0.1300E+02  0.3200E+02  0.1700E+02
        0.4300E+02

ROW  9  0.1400E+02  0.7000E+01  0.3400E+02  0.2750E+02  0.3800E+02  0.4100E+02
        0.1150E+02  0.4600E+02

ROW 10  0.3000E+01  0.5100E+02  0.4900E+02  0.2900E+02  0.5200E+02  0.5300E+02
        0.4000E+01  0.4400E+02  0.1150E+02

ROW 11  0.3550E+02  0.2000E+01  0.4900E+02  0.4500E+02  0.1600E+02  0.3700E+02
        0.3900E+02  0.4200E+02  0.8000E+01  0.3550E+02

  10 ROWS ARE READ.
      9.    COMPUTE
```

2

SOLUTION IN 3 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

RAW STRESS DHAT	=	0.127279
STRESS DHAT	=	0.038248
RAW STRESS DSTAR	=	0.312591
COEF. ALIEN. DSTAR	=	0.059913

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.138224

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 11
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 60

F I N A L C O N F I G U R A T I O N

1	-0.6330	0.5238	-0.1591
2	-0.0759	-0.8210	-0.4160
3	0.7000	0.6512	-0.1408
4	0.7135	0.2392	-0.4232
5	0.5374	-0.8480	0.0744
6	0.7564	-0.6321	0.8310
7	-0.7155	0.6141	-0.1576
8	0.7604	0.5979	0.4397
9	-0.7287	-0.2420	-0.1214
10	-0.7202	0.6220	0.4240
11	-0.6735	-0.8051	-0.3511
OMEAN	0.0000	0.0000	0.0000
OSIGMA	0.6650	0.5390	0.3349

743

DISTANCES

7	1	0.1125	11	2	0.5966	10	1	0.5831	10	7	0.5815	8	3	0.5805
5	2	0.6657	9	2	0.6637	11	9	0.5631	4	3	0.4124	6	5	0.7566
9	7	0.8561	10	9	0.8643	8	4	0.8630	9	1	0.8658	4	2	1.0628
11	5	1.2603	8	6	1.2300	3	1	1.3029	6	3	1.2870	6	2	1.2478
6	4	1.2555	4	1	1.3164	5	4	1.0872	2	1	1.4448	3	2	1.4723
5	3	1.4992	7	4	1.4289	9	4	1.4422	10	4	1.4339	7	5	1.4896
7	3	1.4155	8	2	1.4194	8	5	1.4460	9	3	1.4291	11	10	1.4272
11	1	1.4289	11	6	1.4415	9	5	1.3161	11	7	1.4192	8	1	1.3634
9	6	1.4857	11	8	1.5038	8	7	1.4759	10	8	1.4807	11	4	1.3907
9	8	1.4893	7	2	1.4351	11	3	1.5059	10	3	1.4202	5	1	1.4811
10	2	1.4432	10	5	1.4972	10	6	1.4930	6	1	1.3988	7	6	1.4885

744

KOC3 KOWARERU 3

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1125	11	2	0.5808	10	1	0.5808	10	7	0.5808	8	3	0.5808
5	2	0.5803	9	2	0.5808	11	9	0.5808	4	3	0.5808	6	5	0.7566
9	7	0.8561	10	9	0.8636	8	4	0.8636	9	1	0.8658	4	2	1.0628
11	5	1.2454	8	6	1.2454	3	1	1.2495	6	3	1.2495	5	2	1.2495
6	4	1.2495	4	1	1.2495	5	4	1.2495	2	1	1.4304	3	2	1.4304
5	3	1.4304	7	4	1.4304	9	4	1.4304	10	4	1.4304	7	5	1.4304
7	3	1.4304	8	2	1.4304	8	5	1.4304	9	3	1.4304	11	10	1.4304
11	1	1.4304	11	6	1.4304	9	5	1.4304	11	7	1.4304	8	1	1.4304
9	6	1.4643	11	8	1.4643	8	7	1.4643	10	8	1.4643	11	4	1.4643
9	8	1.4643	7	2	1.4643	11	3	1.4643	10	3	1.4643	5	1	1.4643
10	2	1.4643	10	5	1.4643	10	6	1.4643	6	1	1.4643	7	6	1.4885

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1125	11	2	0.4124	10	1	0.5531	10	7	0.5805	8	3	0.5816
5	2	0.5831	9	2	0.5966	11	9	0.6637	4	3	0.6657	6	5	0.7566
9	7	0.8561	10	9	0.8630	8	4	0.8643	9	1	0.8658	4	2	1.0628
11	5	1.0872	8	6	1.2300	3	1	1.2478	6	3	1.2555	5	2	1.2608
6	4	1.2870	4	1	1.3029	5	4	1.3161	2	1	1.3164	3	2	1.3634
5	3	1.3907	7	4	1.3988	9	4	1.4155	10	4	1.4192	7	5	1.4194
7	3	1.4202	8	2	1.4272	8	5	1.4289	9	3	1.4289	11	10	1.4291
11	1	1.4339	11	6	1.4351	9	5	1.4415	11	7	1.4422	8	1	1.4432
9	6	1.4448	11	8	1.4460	8	7	1.4723	10	8	1.4759	11	4	1.4807
9	8	1.4811	7	2	1.4857	11	3	1.4885	10	3	1.4893	5	1	1.4896
10	2	1.4930	10	5	1.4972	10	6	1.4992	6	1	1.5038	7	6	1.5059

4

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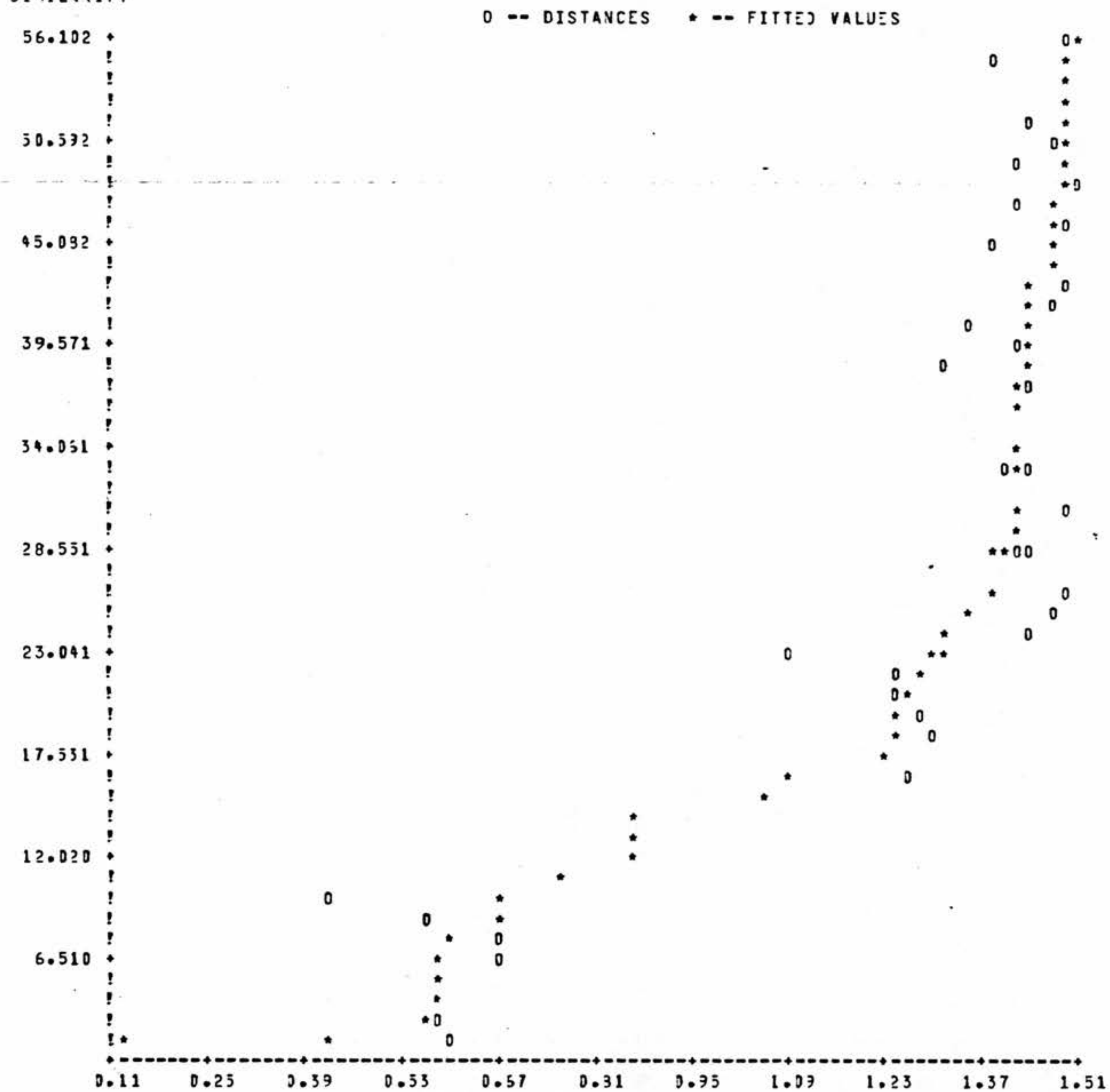
KOC3

KOWARERU

SIMILARITY



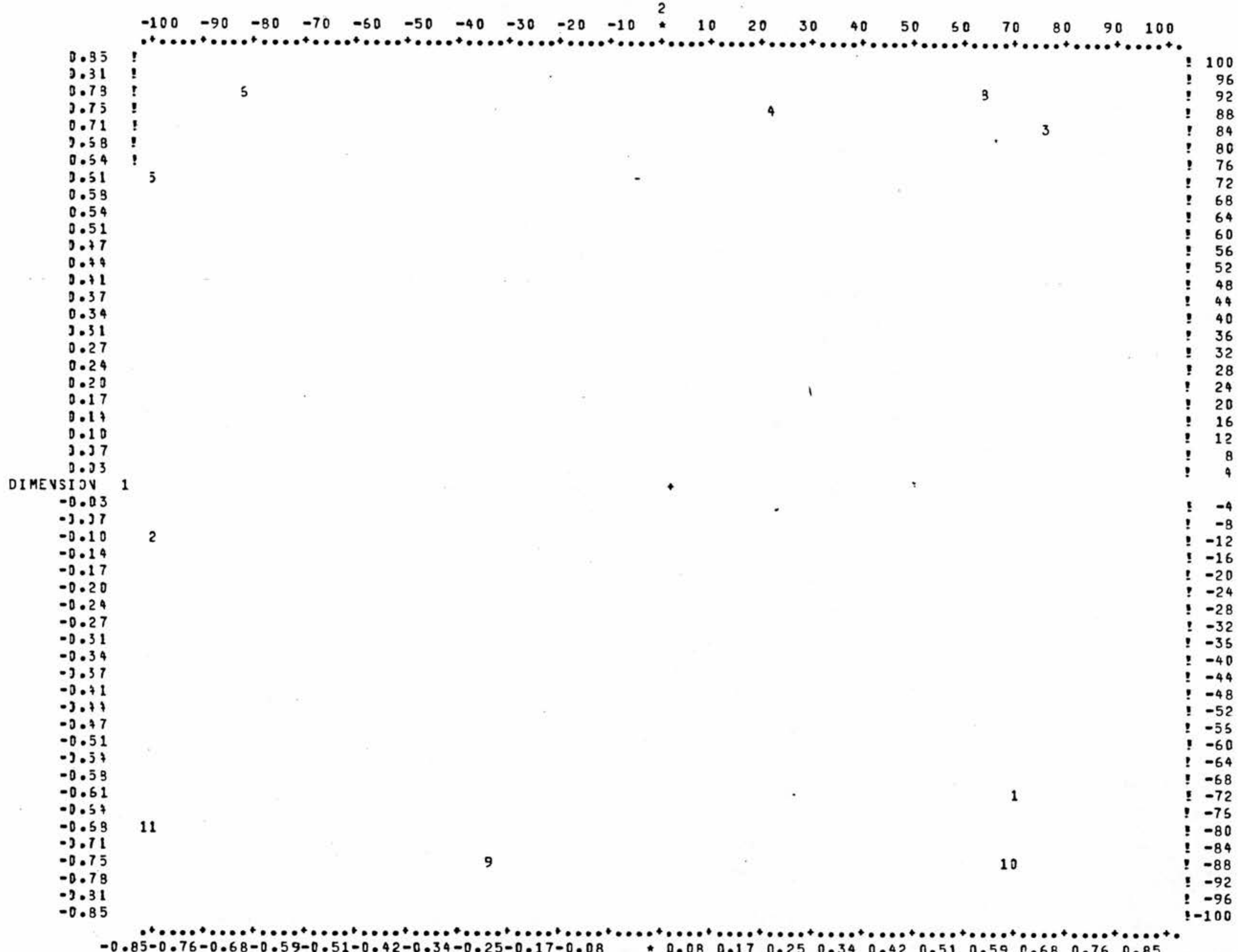
745

1KOC3 KOWARERU

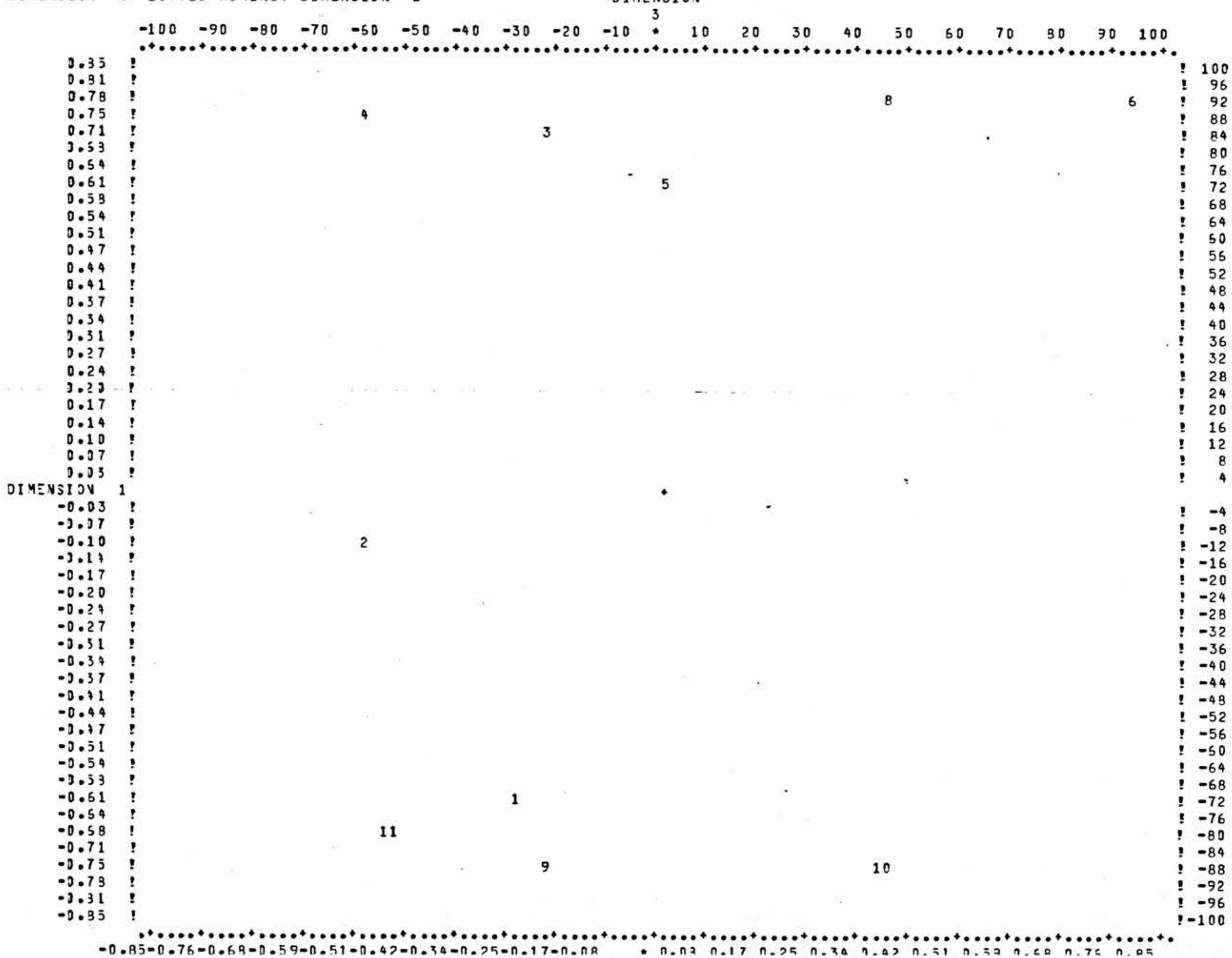
FINAL CONFIGURATION

DIMENSION 2 PLOTTED AGAINST DIMENSION 1

5



FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 1

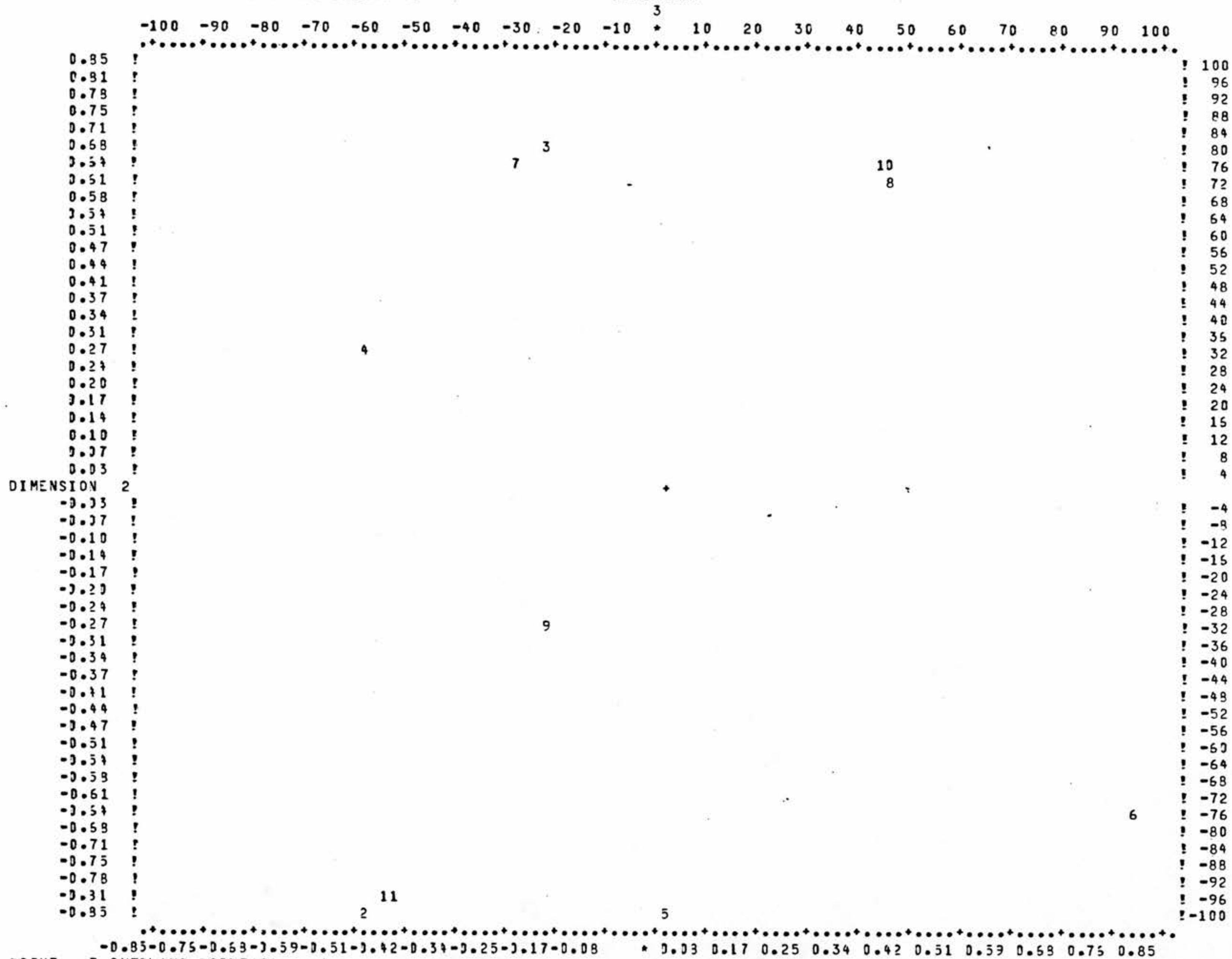


6

747

FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 2

7



POINT 7 OVERLAYS POINT(S) 1

SOLUTION IN 2 DIMENSIONS:

* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

RAW STRESS DHAT	=	0.563381
STRESS DHAT	=	0.075860
RAW STRESS DSTAR	=	1.311211
COEF. ALIEN. DSTAR	=	0.115537

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.170667

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 2
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 10

F I N A L C O N F I G U R A T I O N

1	-0.6010	0.6809
2	-0.3273	-0.8592
3	0.7507	0.6774
4	0.7947	0.2399
5	0.4765	-0.9281
6	0.9509	-0.7926
7	-0.7548	0.5130
8	0.8651	0.6730
9	-0.7895	-0.1156
10	-0.7551	0.5784
11	-0.6303	-0.8571
OMEAN	0.0000	0.0000
OSIGMA	0.7222	0.6917

DISTANCES

7	1	0.1533	11	2	0.3029	10	1	0.1541	10	7	0.0654	8	3	0.1045
5	2	0.8038	9	2	0.7538	11	9	0.7415	4	3	0.4375	6	5	0.4844
9	7	0.7285	10	9	0.7940	8	4	0.4331	9	1	0.7964	4	2	1.1821
11	5	1.1067	8	6	1.4657	3	1	1.3617	6	3	1.4701	6	2	1.2882
6	4	1.0325	4	1	1.3957	5	4	1.1580	2	1	1.5501	3	2	1.5485
5	3	1.6056	7	4	1.5495	9	4	1.5843	10	4	1.5498	7	5	1.5496
7	3	1.5154	8	2	1.5480	8	5	1.6011	9	3	1.5502	11	10	1.5355
11	1	1.5379	11	6	1.5912	9	5	1.2665	11	7	1.4701	8	1	1.4661
9	6	1.7504	11	8	1.6039	8	7	1.5199	10	8	1.5202	11	4	1.4300
9	8	1.6547	7	2	1.4822	11	3	1.5692	10	3	1.5157	5	1	1.6101
10	2	1.5476	10	5	1.6119	10	6	1.7370	6	1	1.6153	7	6	1.7282

8

750

9

FITTED VALUES

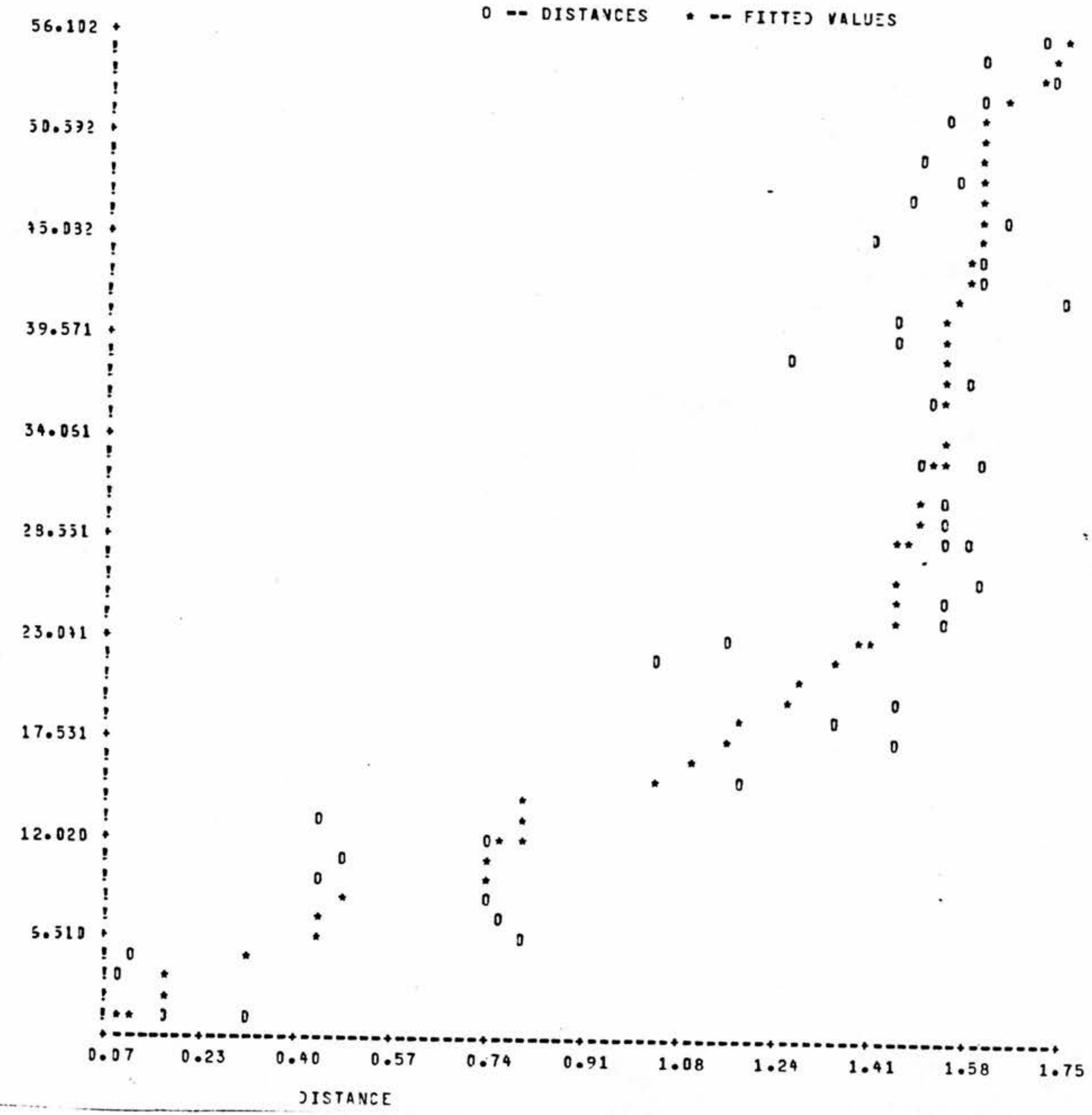
PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1538	11	2	0.1567	10	1	0.1567	10	7	0.1567	8	3	0.1567
5	2	0.6442	9	2	0.6442	11	9	0.6442	4	3	0.6442	6	5	0.6442
9	7	0.6519	10	9	0.6519	8	4	0.6519	9	1	0.7964	4	2	1.1444
11	5	1.1444	8	6	1.3117	3	1	1.3117	6	3	1.3117	6	2	1.3117
6	4	1.3117	4	1	1.3117	5	4	1.3117	2	1	1.5306	3	2	1.5306
5	3	1.5305	7	4	1.5306	9	4	1.5305	10	4	1.5305	7	5	1.5306
7	3	1.5305	8	2	1.5306	8	5	1.5306	9	3	1.5305	11	10	1.5306
11	1	1.5305	11	6	1.5306	9	5	1.5306	11	7	1.5306	8	1	1.5306
9	6	1.5822	11	8	1.5822	8	7	1.5822	10	8	1.5822	11	4	1.5822
9	3	1.5822	7	2	1.5822	11	3	1.5822	10	3	1.5822	5	1	1.5822
10	2	1.5822	10	5	1.6119	10	6	1.6762	6	1	1.6762	7	6	1.7282

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

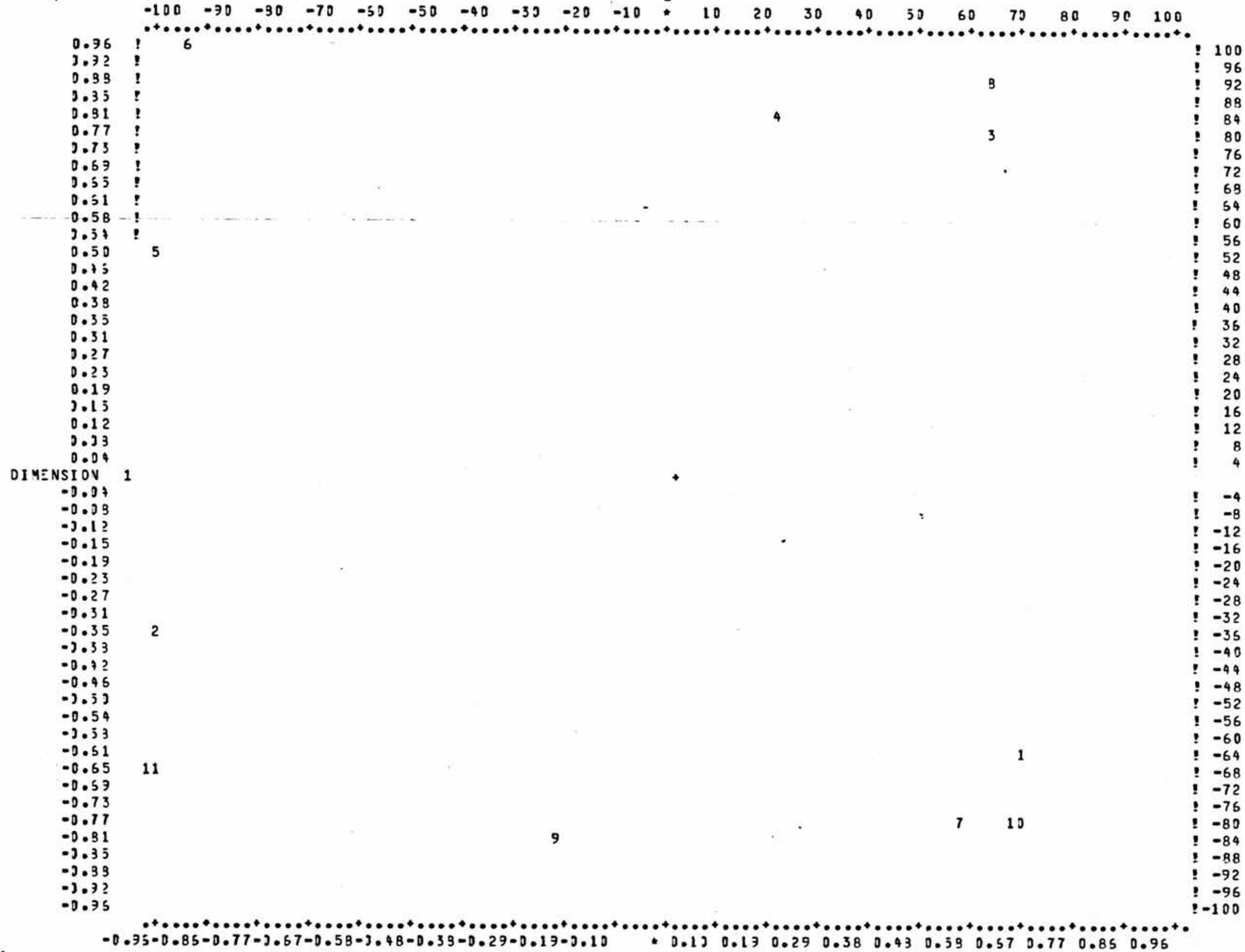
7	1	0.0654	11	2	0.1045	10	1	0.1539	10	7	0.1541	8	3	0.3029
5	2	0.4331	9	2	0.4375	11	9	0.4844	4	3	0.7286	6	5	0.7415
9	7	0.7538	10	9	0.7940	8	4	0.7964	9	1	0.8038	4	2	1.0325
11	5	1.1067	8	6	1.1680	3	1	1.1921	6	3	1.2565	6	2	1.2882
6	4	1.3617	4	1	1.3957	5	4	1.4300	2	1	1.4657	3	2	1.4661
5	3	1.4701	7	4	1.4701	9	4	1.4822	10	4	1.5154	7	5	1.5157
7	3	1.5355	8	2	1.5379	8	5	1.5476	9	3	1.5480	11	10	1.5485
11	1	1.5495	11	6	1.5496	9	5	1.5498	11	7	1.5501	8	1	1.5502
9	6	1.5692	11	8	1.5843	8	7	1.5912	10	8	1.6011	11	4	1.6039
9	3	1.6056	7	2	1.6101	11	3	1.6119	10	3	1.6153	5	1	1.6199
10	2	1.6202	10	5	1.6547	10	6	1.7282	6	1	1.7370	7	6	1.7504

KOC3
KOWARERJ
SIMILARITY



751

FINAL CONFIGURATION
DIMENSION 2 PLOTTED AGAINST DIMENSION 1



1

10. FINISH

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+----------------------------------------------------------------------------------+
|                              M  D  S  (X)  PROGRAMS                               |
|                                                                                  |
|   AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND |
|   LANGUAGE.                                                                      |
|                                                                                  |
|   PROGRAMS AND SUPPORTING DOCUMENTATION       OTHER ENQUIRIES SHOULD             |
|   ARE DISTRIBUTED FROM                        BE ADDRESSED TO                    |
|                                                                                  |
|   MDS(X) PROJECT,                             MDS(X) PROJECT,                    |
|   PROGRAM LIBRARY UNIT,                       SOCIOLOGICAL RESEARCH UNIT,        |
|   UNIVERSITY OF EDINBURGH,                    UNIVERSITY COLLEGE,                |
|   18 BUCCLEUCH PLACE,                         P.O. BOX 78,                       |
|   EDINBURGH EH8 9LN,                          CARDIFF CF1 1XL,                   |
|   U.K.                                        U.K.                               |
|                                                                                  |
|   USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN   |
|   PUBLISHING RESULTS.                                                            |
+----------------------------------------------------------------------------------+

     1.    RUN NAME        KOK1
     2.    TASK NAME        KOWARERU
     3.    £ OF STIMULI     11
     4.    PRINT DATA       YES
     5.    PARAMETERS       DATA TYPE(1),MINKOWSKI(12.0)
     6.    DIMENSION        2 TO 5
     7.    INPUT FORMAT     (10F5.0)
     8.    READ MATRIX
ROW  2  0.4700E+02

ROW  3  0.2100E+02  0.2400E+02

ROW  4  0.2200E+02  0.1100E+02  0.1000E+02

ROW  5  0.5200E+02  0.6000E+01  0.2600E+02  0.2000E+02

ROW  6  0.5000E+02  0.1800E+02  0.1300E+02  0.2300E+02  0.9000E+01

ROW  7  0.1000E+01  0.3400E+02  0.3200E+02  0.3500E+02  0.5100E+02  0.5500E+02

ROW  8  0.3100E+02  0.2700E+02  0.5000E+01  0.1400E+02  0.2900E+02  0.1900E+02
        0.3600E+02

ROW  9  0.1200E+02  0.7000E+01  0.3900E+02  0.2800E+02  0.4000E+02  0.4300E+02
        0.1700E+02  0.3800E+02

ROW 10  0.4000E+01  0.4600E+02  0.4900E+02  0.2500E+02  0.5300E+02  0.5400E+02
        0.3000E+01  0.4200E+02  0.1500E+02

ROW 11  0.4100E+02  0.2000E+01  0.4500E+02  0.3700E+02  0.1600E+02  0.3300E+02
        0.4400E+02  0.4800E+02  0.8000E+01  0.3000E+02

  10 ROWS ARE READ.
     9.    COMPUTE
```

153

10K1 KOWARERU

2

SOLUTION IN 3 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

RAW STRESS DHAT	=	0.004543
STRESS DHAT	=	0.007398
RAW STRESS DSTAR	=	0.011832
COEF. ALIEN. DSTAR	=	0.011939

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.138224

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 13
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 113

F I N A L C O N F I G U R A T I O N

1	-0.8870	0.4807	0.5234
2	0.3155	-0.6078	-0.6124
3	0.3410	0.5893	0.0056
4	0.2614	0.5445	-0.6515
5	0.9699	-0.6278	-0.1319
6	0.9822	-0.5574	0.5268
7	-0.9114	0.4761	0.5307
8	0.3397	0.5818	0.4850
9	-0.3070	-0.6656	-0.0331
10	-0.9455	0.4921	0.0473
11	-0.1659	-0.7058	-0.6900
OMEAN	0.0000	0.0000	0.0000
OSIGMA	0.6700	0.5798	0.4636

0K1 KOWARERU

DISTANCES

7	1	0.0245	11	2	0.4844	10	7	0.4834	10	1	0.4761	8	3	0.4794
5	2	0.6525	9	2	0.6401	11	9	0.6569	6	5	0.6586	4	3	0.6572
4	2	1.1523	9	1	1.1465	6	3	1.1468	8	4	1.1366	10	9	1.1580
11	5	1.1357	9	7	1.1423	6	2	1.1393	8	6	1.1393	5	4	1.1724
3	1	1.2280	4	1	1.2316	6	4	1.2153	3	2	1.1972	10	4	1.2071
5	3	1.2171	8	2	1.2220	9	4	1.2103	8	5	1.2096	11	10	1.1987
8	1	1.2267	7	3	1.2525	11	6	1.2584	7	2	1.2814	7	4	1.2477
8	7	1.2511	11	4	1.2502	9	8	1.2476	9	3	1.2551	9	5	1.2729
11	1	1.2723	10	8	1.2652	9	6	1.2852	11	7	1.2747	11	3	1.2951
10	2	1.2824	2	1	1.2650	11	8	1.3188	10	3	1.2365	6	1	1.8693
7	5	1.8816	5	1	1.8572	10	5	1.9156	10	6	1.9277	7	6	1.8937

734

755

OK1 KOWARERU 3

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0245	11	2	0.4808	10	7	0.4808	10	1	0.4808	8	3	0.4808
5	2	0.6465	9	2	0.6465	11	9	0.6569	6	5	0.6579	4	3	0.6579
4	2	1.1441	9	1	1.1441	6	3	1.1441	8	4	1.1441	10	9	1.1441
11	5	1.1441	9	7	1.1441	6	2	1.1441	8	6	1.1441	5	4	1.1724
3	1	1.2137	4	1	1.2137	6	4	1.2137	3	2	1.2137	10	4	1.2137
5	3	1.2137	8	2	1.2137	9	4	1.2137	8	5	1.2137	11	10	1.2137
8	1	1.2267	7	3	1.2523	11	6	1.2559	7	2	1.2559	7	4	1.2559
8	7	1.2559	11	4	1.2559	9	8	1.2559	9	3	1.2559	9	5	1.2726
11	1	1.2726	10	8	1.2813	9	6	1.2813	11	7	1.2813	11	3	1.2813
10	2	1.2813	2	1	1.2817	11	8	1.3027	10	3	1.3027	6	1	1.8693
7	5	1.8694	5	1	1.8694	10	5	1.9124	10	6	1.9124	7	6	1.9124

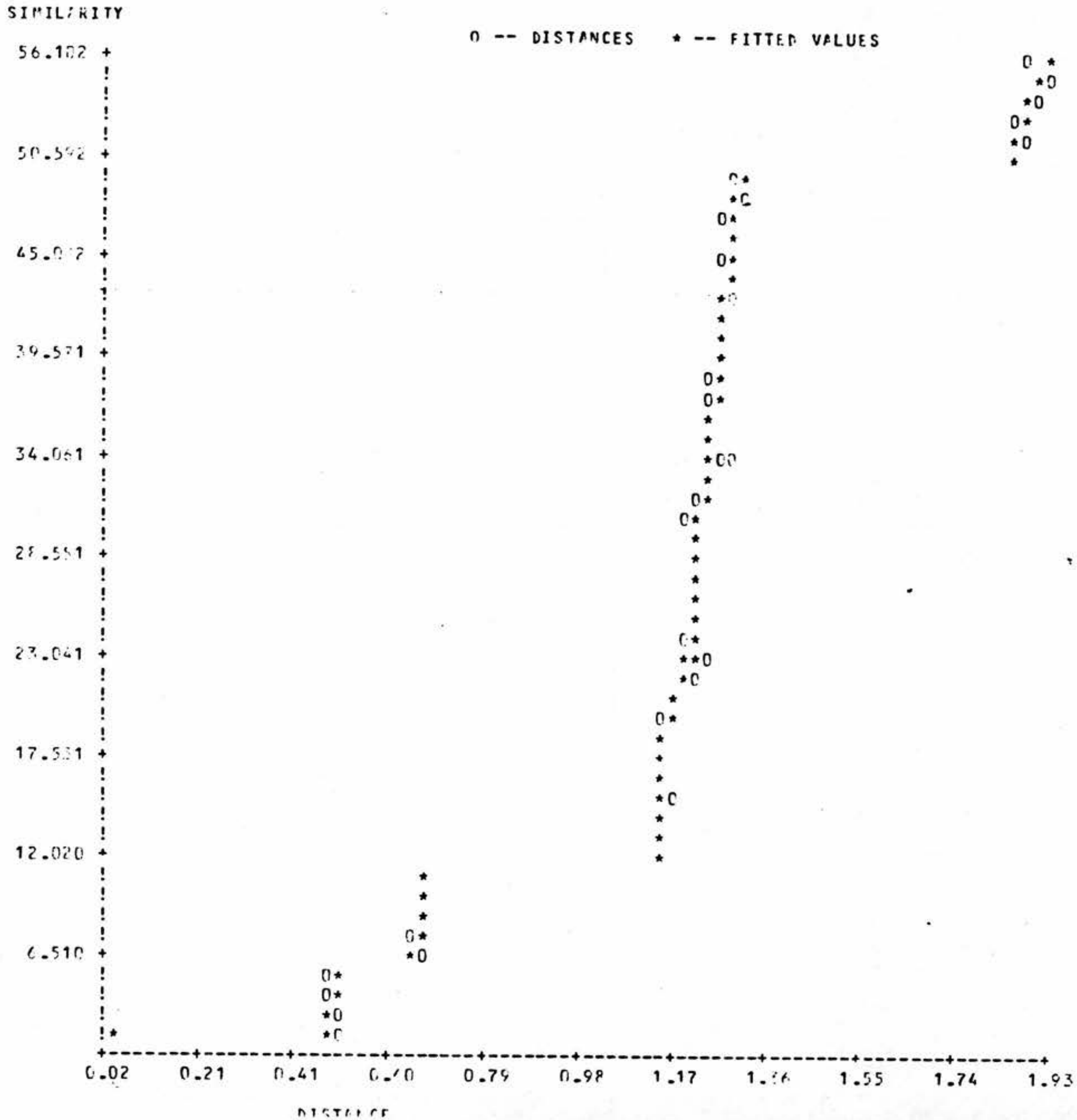
PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0245	11	2	0.4761	10	7	0.4794	10	1	0.4834	8	3	0.4844
5	2	0.6403	9	2	0.6525	11	9	0.6569	6	5	0.6572	4	3	0.6586
4	2	1.1358	9	1	1.1366	6	3	1.1393	8	4	1.1393	10	9	1.1420
11	5	1.1465	9	7	1.1466	6	2	1.1523	8	6	1.1580	5	4	1.1724
3	1	1.1972	4	1	1.1977	6	4	1.2071	3	2	1.2096	10	4	1.2103
5	3	1.2153	8	2	1.2171	9	4	1.2220	8	5	1.2267	11	10	1.2280
8	1	1.2316	7	3	1.2475	11	6	1.2477	7	2	1.2502	7	4	1.2511
8	7	1.2525	11	4	1.2551	9	8	1.2534	9	3	1.2650	9	5	1.2723
11	1	1.2729	10	8	1.2747	9	6	1.2814	11	7	1.2824	11	3	1.2852
10	2	1.2852	2	1	1.2863	11	8	1.2951	10	3	1.3186	6	1	1.8572
7	5	[illegible]	5	1	[illegible]	10	5	1.9037	10	6	1.9157	7	6	1.9274

4

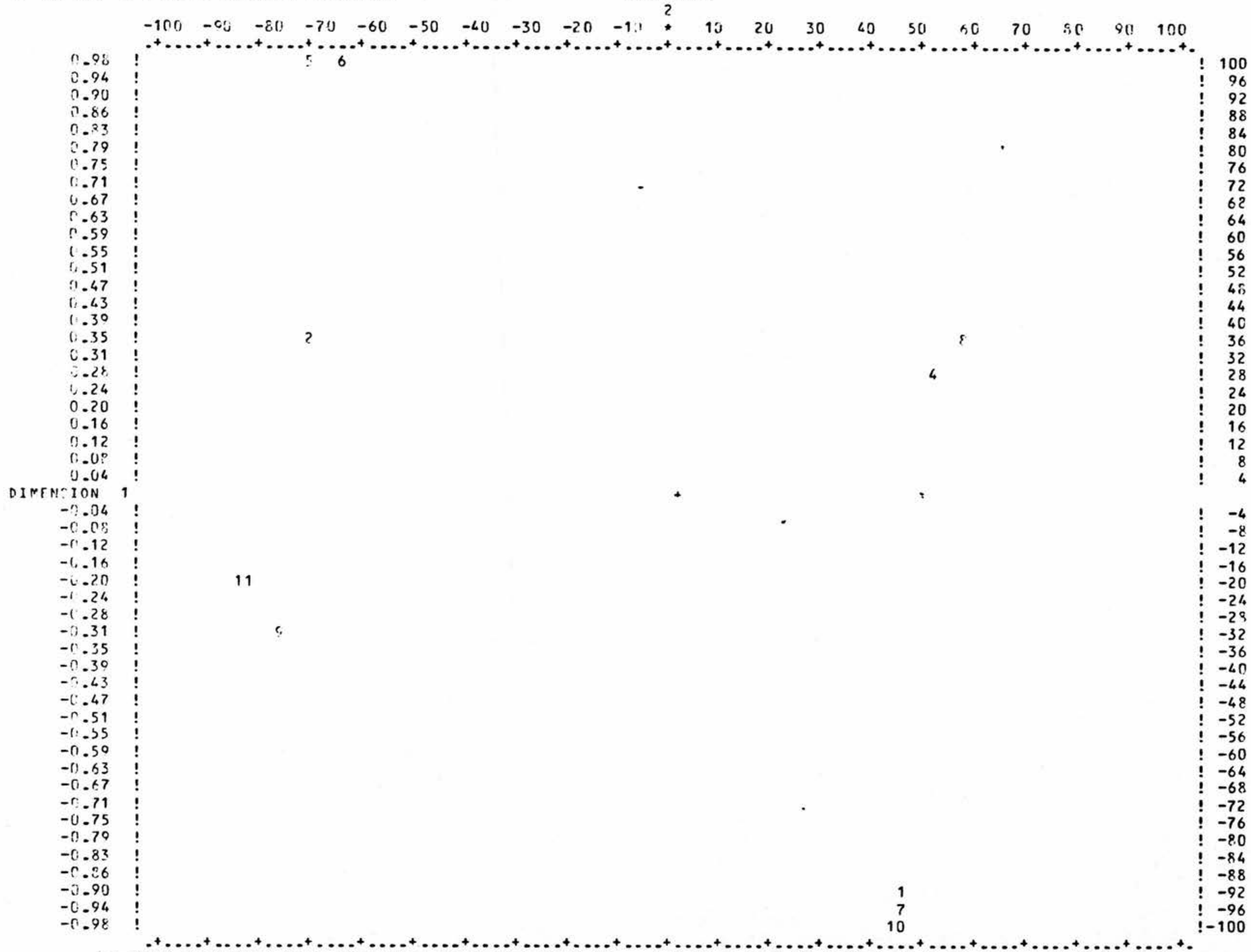
OK1

KOWARERU



5

FINAL CONFIGURATION
DIMENSION 2 PLOTTED AGAINST DIMENSION 1

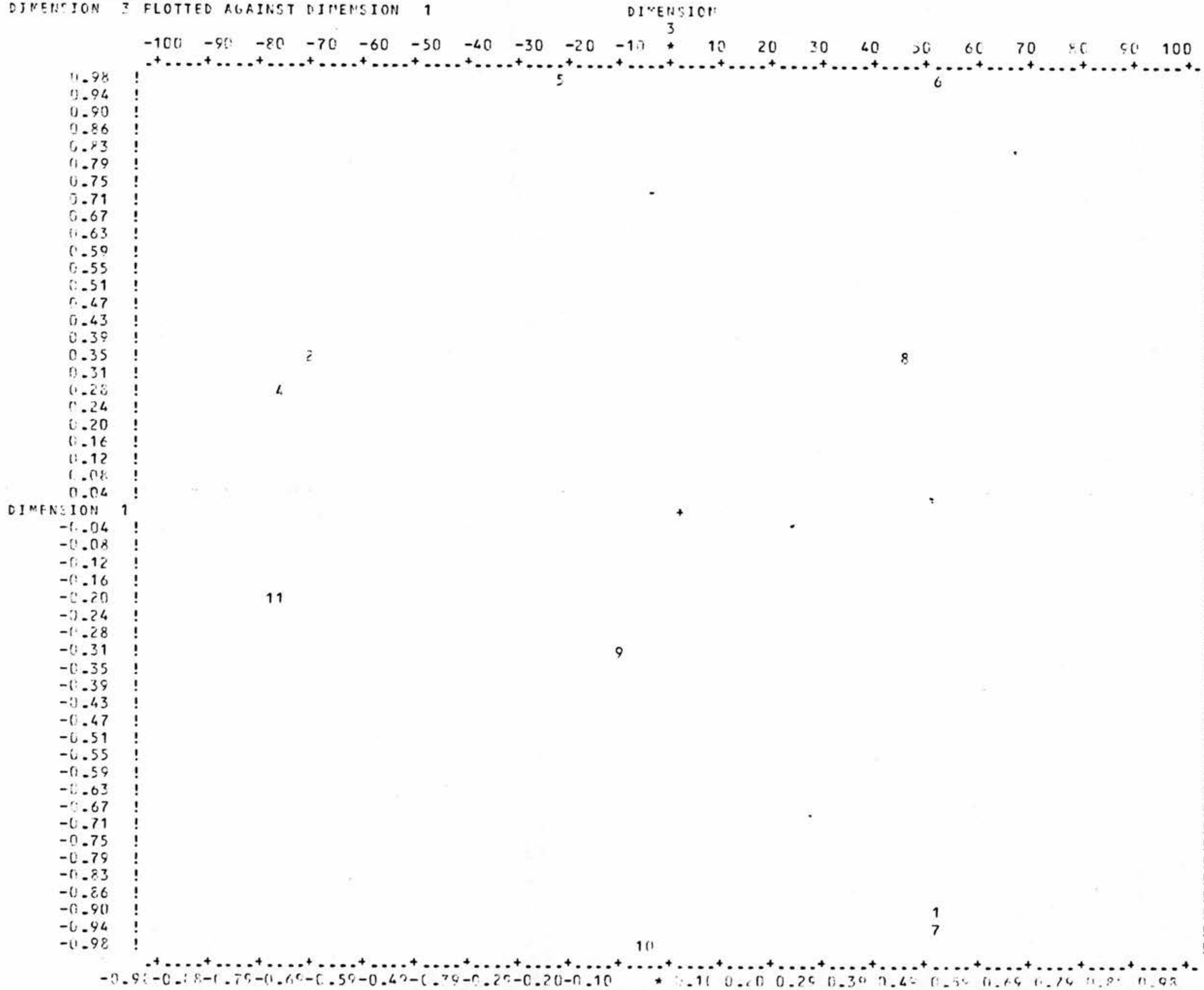


POINT 8 OVERLAYS POINT(S) 3

757

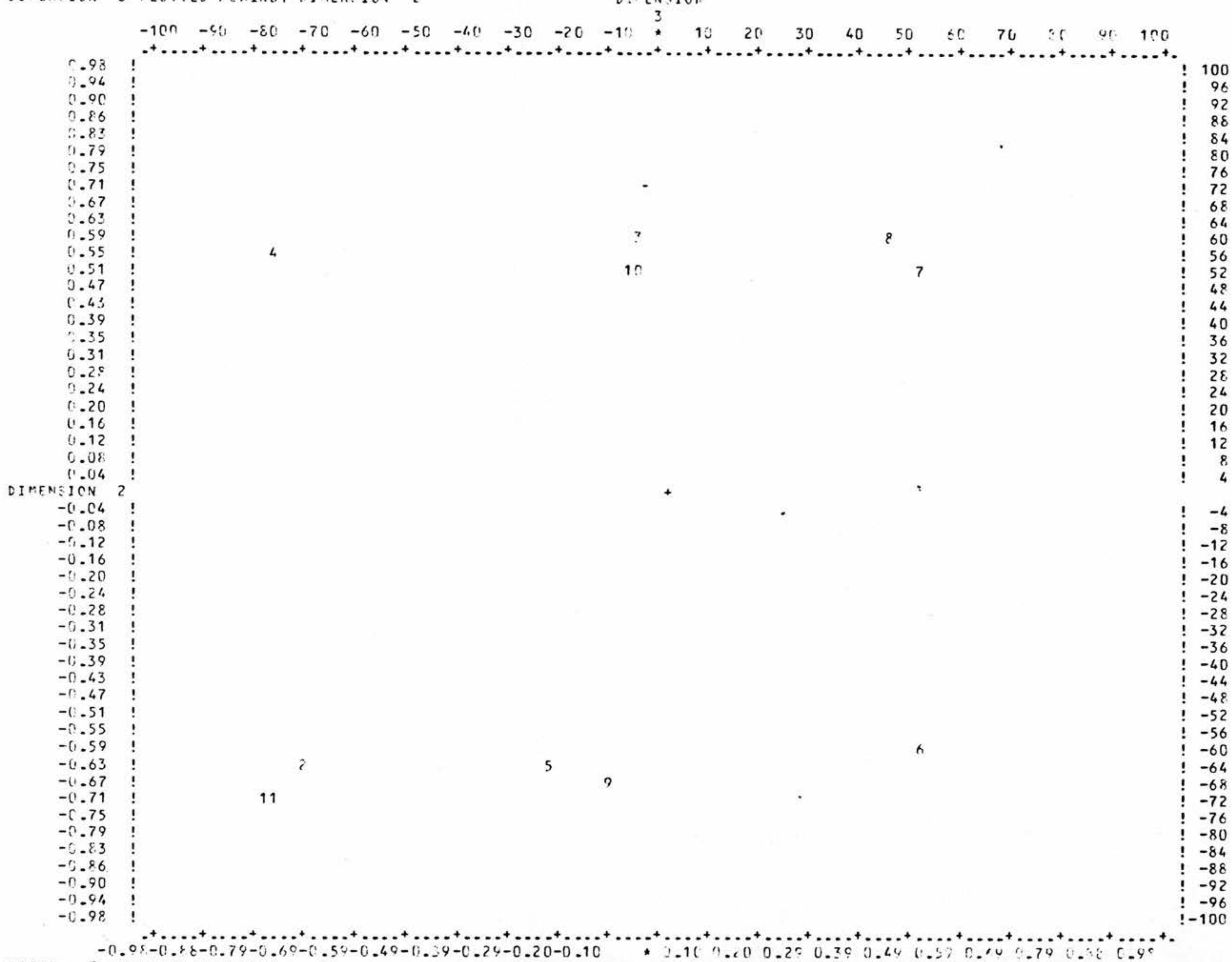
6

FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 1



7

FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 2



759

10K1 KCWARERU

8

SOLUTION IN 2 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

RAW STRESS DHAT	=	0.752017
STRESS DHAT	=	0.056237
RAW STRESS DSTAR	=	1.396080
COEF. ALIEN. DSTAR	=	0.117297

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MAR 1979 V14) = 0.170667

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 5
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 12

760

F I N A L C O N F I G U R A T I O N

1	-1.0363	0.3219
2	0.3780	-0.5539
3	0.3428	0.6635
4	-0.0003	0.4502
5	1.0548	-0.6338
6	1.3118	-0.1856
7	-1.1155	0.5150
8	0.4836	0.7339
9	-0.2389	-0.6207
10	-1.2284	0.2895
11	0.0184	-0.9802
OMEAN	0.0000	0.0000
OSIGMA	0.8133	0.5818

0K1 KCWARERU

DISTANCES

7	1	0.1931	11	2	0.4306	10	7	0.2255	10	1	0.1921	8	3	0.1408
5	2	0.7068	9	2	0.6169	11	9	0.3600	6	5	0.4482	4	3	0.3432
4	2	1.0041	9	1	0.9525	6	3	0.9842	8	4	0.4839	10	9	1.0156
11	5	1.0664	9	7	1.1398	6	2	0.9339	8	6	0.9390	5	4	1.1490
3	1	1.3791	4	1	1.0365	6	4	1.3122	3	2	1.2174	10	4	1.2282
5	3	1.2975	8	2	1.2872	9	4	1.0709	8	5	1.3677	11	10	1.3337
8	1	1.5199	7	3	1.4587	11	6	1.2937	7	2	1.4957	7	4	1.1152
8	7	1.5991	11	4	1.4304	9	8	1.3547	9	3	1.2842	9	5	1.3237
11	1	1.3105	10	8	1.7120	9	6	1.5509	11	7	1.4996	11	3	1.6437
10	2	1.6065	2	1	1.4147	11	8	1.7141	10	3	1.5713	6	1	2.3482
7	5	2.2004	5	1	2.1211	10	5	2.3133	10	6	2.5403	7	6	2.4274

761

OK1 KOWARERU 9

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1931	11	2	0.2473	10	7	0.2473	10	1	0.2473	8	3	0.2473
5	2	0.4950	9	2	0.4950	11	9	0.4950	6	5	0.4950	4	3	0.4950
4	2	0.8562	9	1	0.8562	6	3	0.8562	8	4	0.8562	10	9	1.0156
11	5	1.0198	9	7	1.0198	6	2	1.0198	8	6	1.0198	5	4	1.1490
3	1	1.2076	4	1	1.2076	6	4	1.2356	3	2	1.2356	10	4	1.2356
5	3	1.2356	8	2	1.2356	9	4	1.2356	8	5	1.3507	11	10	1.3507
8	1	1.3766	7	3	1.3766	11	6	1.3766	7	2	1.3766	7	4	1.3766
8	7	1.3838	11	4	1.3838	9	8	1.3838	9	3	1.3838	9	5	1.3838
11	1	1.3838	10	8	1.5712	9	6	1.5712	11	7	1.5712	11	3	1.5712
10	2	1.5712	2	1	1.5712	11	8	1.6427	10	3	1.6427	6	1	2.2232
7	5	2.2232	5	1	2.2232	10	5	2.3133	10	6	2.4836	7	6	2.4835

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1405	11	2	0.1921	10	7	0.1931	10	1	0.2255	8	3	0.3432
5	2	0.3600	9	2	0.4306	11	9	0.4482	6	5	0.4839	4	3	0.6169
4	2	0.7068	9	1	0.9339	6	3	0.9390	8	4	0.9525	10	9	0.9842
11	5	1.0041	9	7	1.0156	6	2	1.0360	8	6	1.0664	5	4	1.0709
3	1	1.1152	4	1	1.1393	6	4	1.1490	3	2	1.2174	10	4	1.2282
5	3	1.2842	8	2	1.2872	9	4	1.2937	8	5	1.2975	11	10	1.3105
8	1	1.3122	7	3	1.3237	11	6	1.3337	7	2	1.3547	7	4	1.3677
8	7	1.3791	11	4	1.4147	9	8	1.4304	9	3	1.4583	9	5	1.4957
11	1	1.4996	10	8	1.5199	9	6	1.5508	11	7	1.5713	11	3	1.5991
10	2	1.6065	2	1	1.6437	11	8	1.7120	10	3	1.7141	6	1	2.1211
7	5	2.2004	5	1	2.3133	10	5	2.3482	10	6	2.4274	7	6	2.5403

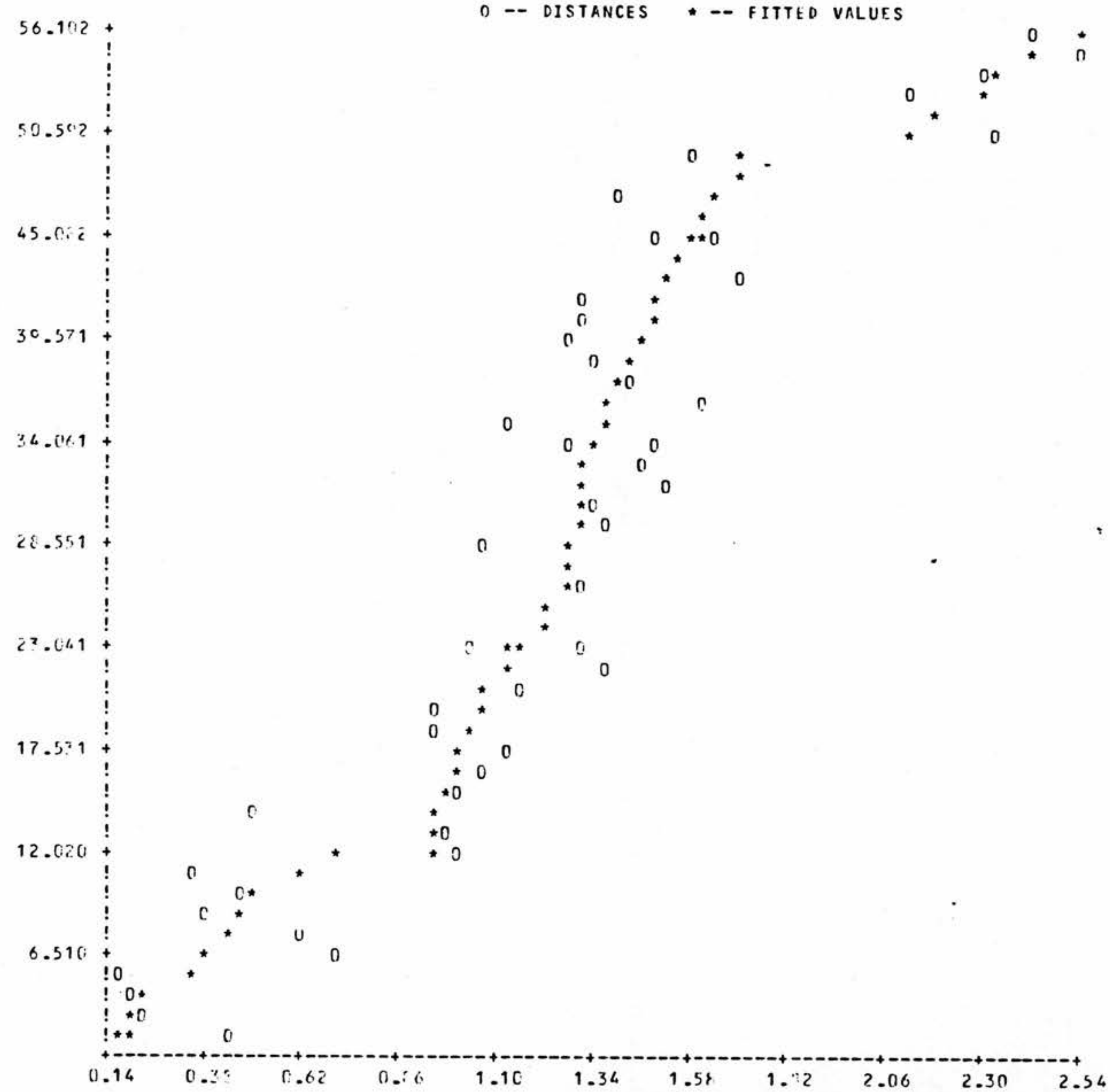
==============

OK1

KOWAPERU

SIMILARITY

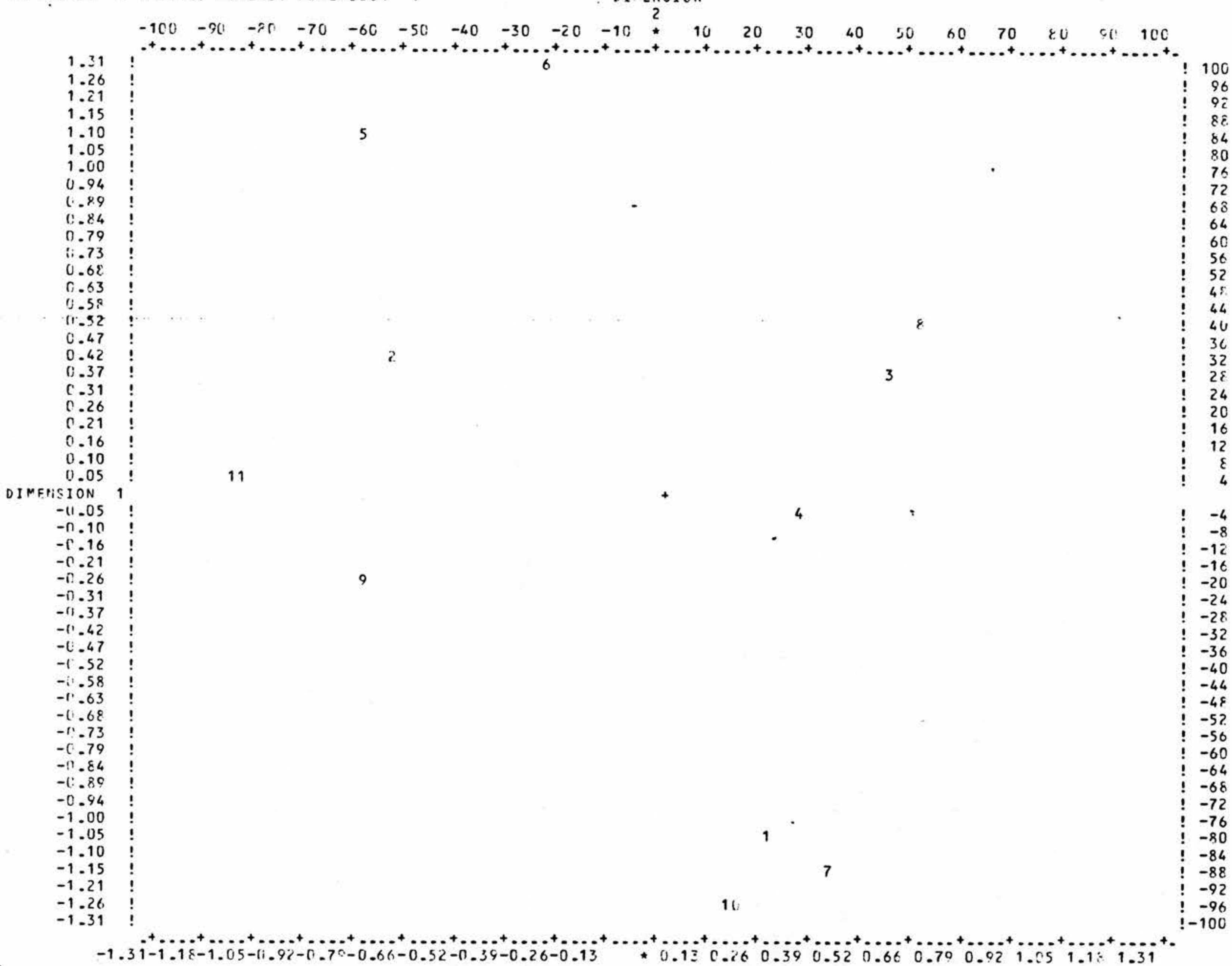
/C



10K1 KOWARERU

FINAL CONFIGURATION

DIMENSION 2 PLOTTED AGAINST DIMENSION 1



1

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+------------------------------------------------------------------------------------------+
|                                                                                          |
|                               M  D  S  (X)  PROGRAMS                                     |
|                                                                                          |
|     AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND      |
|     LANGUAGE.                                                                            |
|                                                                                          |
|     PROGRAMS AND SUPPORTING DOCUMENTATION        OTHER ENQUIRIES SHOULD                  |
|     ARE DISTRIBUTED FROM                         BE ADDRESSED TO                         |
|                                                                                          |
|     MDS(X) PROJECT,                              MDS(X) PROJECT,                         |
|     PROGRAM LIBRARY UNIT,                        SOCIOLOGICAL RESEARCH UNIT,             |
|     UNIVERSITY OF EDINBURGH,                     UNIVERSITY COLLEGE,                     |
|     18 BUCCLEUCH PLACE,                          P.O. BOX 78,                            |
|     EDINBURGH EH8 9LN,                           CARDIFF CF1 1XL,                        |
|     U.K.                                         U.K.                                    |
|                                                                                          |
|     USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN         |
|     PUBLISHING RESULTS.                                                                  |
|                                                                                          |
+------------------------------------------------------------------------------------------+

          1.      RUN NAME        KOK2
          2.      TASK NAME        KOWARERU
          3.      # OF STIMULI     11
          4.      PRINT DATA       YES
          5.      PARAMETERS       DATA TYPE(1),MINKOWSKI(12.0)
          6.      DIMENSION        2 TO 5
          7.      INPUT FORMAT     (10F5.0)
          8.      READ MATRIX

ROW   2  0.2000E+02

ROW   3  0.1600E+02  0.2700E+02

ROW   4  0.2400E+02  0.1900E+02  0.9000E+01

ROW   5  0.5100E+02  0.7000E+01  0.3300E+02  0.2500E+02

ROW   6  0.5200E+02  0.2200E+02  0.1500E+02  0.2100E+02  0.6000E+01

ROW   7  0.1000E+01  0.5300E+02  0.3200E+02  0.3000E+02  0.4600E+02  0.5500E+02

ROW   8  0.3100E+02  0.2800E+02  0.5000E+01  0.1000E+02  0.2600E+02  0.1700E+02
         0.4400E+02

ROW   9  0.1100E+02  0.1300E+02  0.3500E+02  0.1800E+02  0.3800E+02  0.3900E+02
         0.1200E+02  0.3400E+02

ROW  10  0.3000E+01  0.4900E+02  0.5000E+02  0.4000E+02  0.5400E+02  0.4700E+02
         0.4000E+01  0.2900E+02  0.1400E+02

ROW  11  0.4200E+02  0.2000E+01  0.4800E+02  0.4300E+02  0.2300E+02  0.4100E+02
         0.3700E+02  0.4500E+02  0.8000E+01  0.3600E+02

  10 ROWS ARE READ.
          9.      COMPUTE
```

10K2 KOWARERU

2

SOLUTION IN 3 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

RAW STRESS DHAT	=	0.167631
STRESS DHAT	=	0.045724
RAW STRESS DSTAR	=	0.400661
COEF. ALIEN. DSTAR	=	0.070646

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.138224

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 2
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTEP ITERATION 41

765

F I N A L C O N F I G U R A T I O N

1	-0.6864	-0.0152	0.6061
2	0.1573	0.5899	-0.6223
3	0.4097	-0.8437	-0.5995
4	0.4704	-0.5571	-0.5940
5	0.7281	0.5916	-0.0239
6	0.7495	0.3693	0.5669
7	-0.7178	-0.0143	0.7526
8	0.6800	-0.7846	-0.0645
9	-0.6549	0.5277	-0.1180
10	-0.6959	-0.5452	0.7723
11	-0.4398	0.6813	-0.6757
0MEAN	0.0000	0.0000	0.0000
0SIGMA	0.6076	0.5651	0.5591

0K2 KOWARERU

DISTANCES

7	1	0.1465	11	2	0.5971	10	1	0.5300	10	7	0.5309	8	3	0.5350
6	5	0.5909	5	2	0.6212	11	9	0.5577	4	3	0.2866	8	4	0.5295
9	1	0.7260	9	7	0.8709	9	2	0.8123	10	9	1.0820	6	3	1.2631
3	1	1.2346	8	6	1.1539	9	4	1.1729	4	2	1.1470	2	1	1.2296
6	4	1.1672	6	2	1.1853	11	5	1.1680	4	1	1.2509	5	4	1.1497
8	5	1.3762	3	2	1.4336	8	2	1.3745	10	8	1.3762	7	4	1.3694
8	1	1.3665	7	3	1.3645	5	3	1.4353	9	8	1.4029	9	3	1.3768
11	10	1.4635	11	7	1.4284	9	5	1.3829	9	6	1.4044	10	4	1.3823
11	6	1.2917	11	1	1.2819	11	4	1.2409	8	7	1.3981	11	8	1.4706
7	5	1.4459	10	6	1.4459	11	3	1.5251	10	2	1.4044	10	3	1.3801
5	1	1.4145	6	1	1.4359	7	2	1.3755	10	5	1.4318	7	6	1.4673

OK2

KOWARERU

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

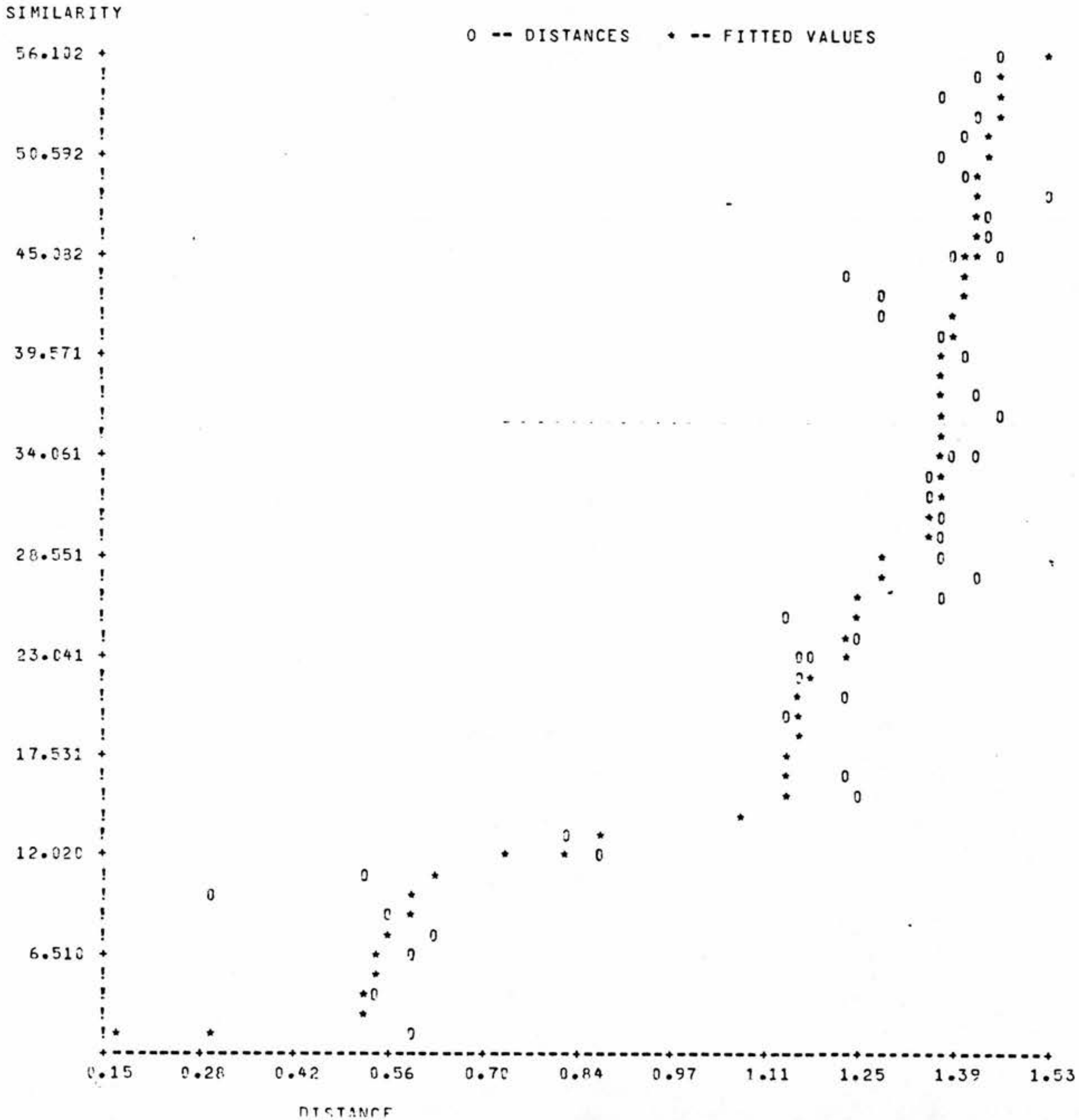
7	1	0.1465	11	2	0.5310	10	1	0.5310	10	7	0.5310	8	3	0.5310
6	5	0.5310	5	2	0.5310	11	9	0.5310	4	3	0.5310	8	4	0.5310
9	1	0.7260	9	7	0.8416	9	2	0.8416	10	9	1.0820	6	3	1.1917
3	1	1.1917	8	6	1.1917	9	4	1.1917	4	2	1.1917	2	1	1.1917
6	4	1.1917	6	2	1.1917	11	5	1.1917	4	1	1.1998	5	4	1.1998
8	5	1.3751	3	2	1.3751	8	2	1.3751	10	8	1.3751	7	4	1.3751
8	1	1.3751	7	3	1.3751	5	3	1.3751	9	8	1.3751	9	3	1.3751
11	10	1.3751	11	7	1.3751	9	5	1.3751	9	6	1.3751	10	4	1.3751
11	6	1.3751	11	1	1.3751	11	4	1.3751	8	7	1.3981	11	8	1.4330
7	5	1.4330	10	6	1.4330	11	3	1.4330	10	2	1.4330	10	3	1.4330
5	1	1.4330	6	1	1.4330	7	2	1.4330	10	5	1.4330	7	6	1.4673

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1465	11	2	0.2866	10	1	0.5295	10	7	0.5300	8	3	0.5309
6	5	0.5350	5	2	0.5577	11	9	0.5909	4	3	0.5971	8	4	0.6212
9	1	0.7260	9	7	0.8123	9	2	0.8709	10	9	1.0820	6	3	1.1470
3	1	1.1487	8	6	1.1539	9	4	1.1672	4	2	1.1680	2	1	1.1729
6	4	1.1893	6	2	1.2256	11	5	1.2346	4	1	1.2409	5	4	1.2509
8	5	1.2631	3	2	1.2819	8	2	1.2917	10	8	1.3645	7	4	1.3665
8	1	1.3694	7	3	1.3745	5	3	1.3755	9	8	1.3762	9	3	1.3762
11	10	1.3768	11	7	1.3801	9	5	1.3823	9	6	1.3829	10	4	1.3981
11	6	1.4023	11	1	1.4044	11	4	1.4344	8	7	1.4145	11	8	1.4284
7	5	1.4318	10	6	1.4336	11	3	1.4353	10	2	1.4359	10	3	1.4459
5	1	1.4459	6	1	1.4635	7	2	1.4673	10	5	1.4706	7	6	1.5251

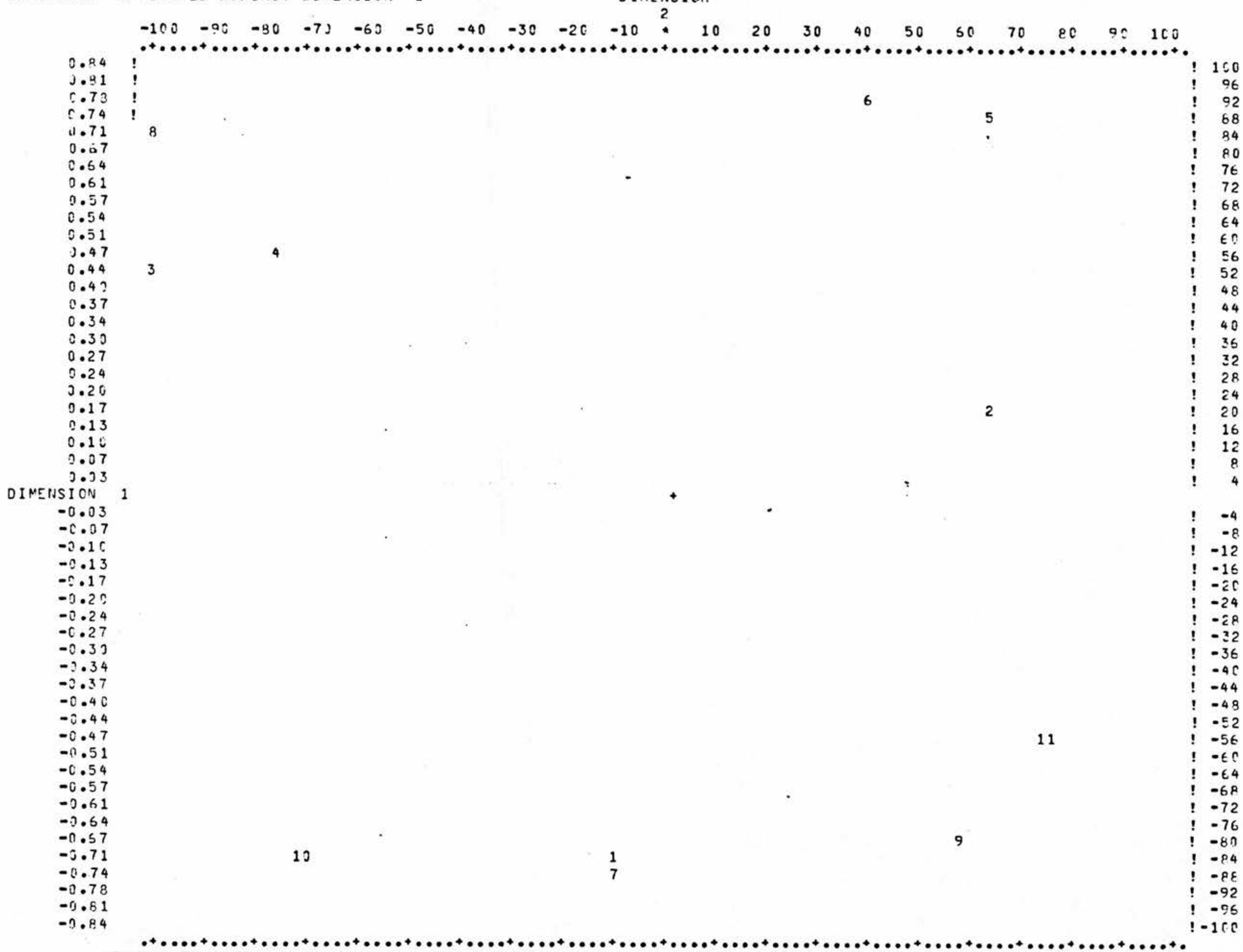
OK2

KOWAPERU



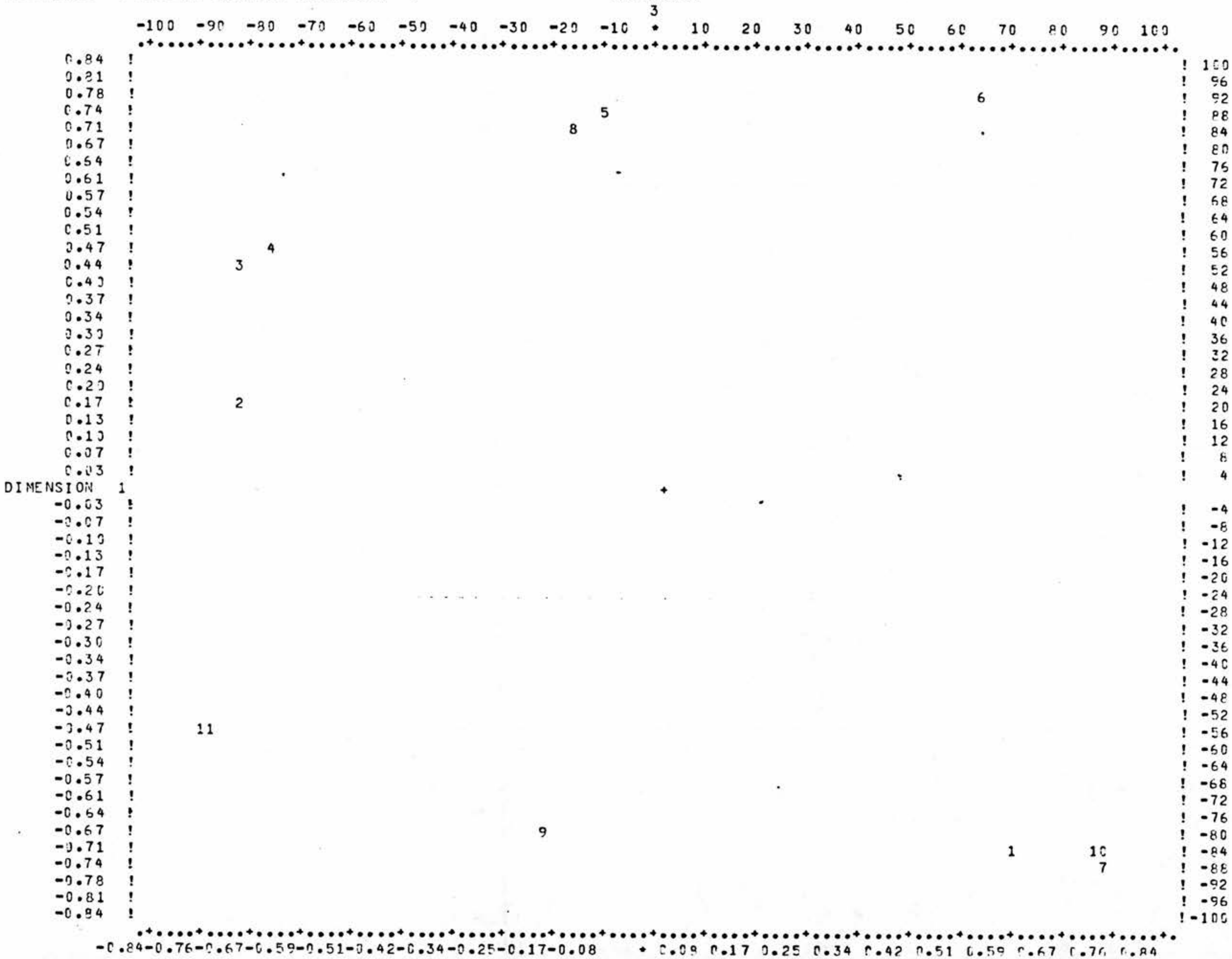
5

FINAL CONFIGURATION
DIMENSION 2 PLOTTED AGAINST DIMENSION 1

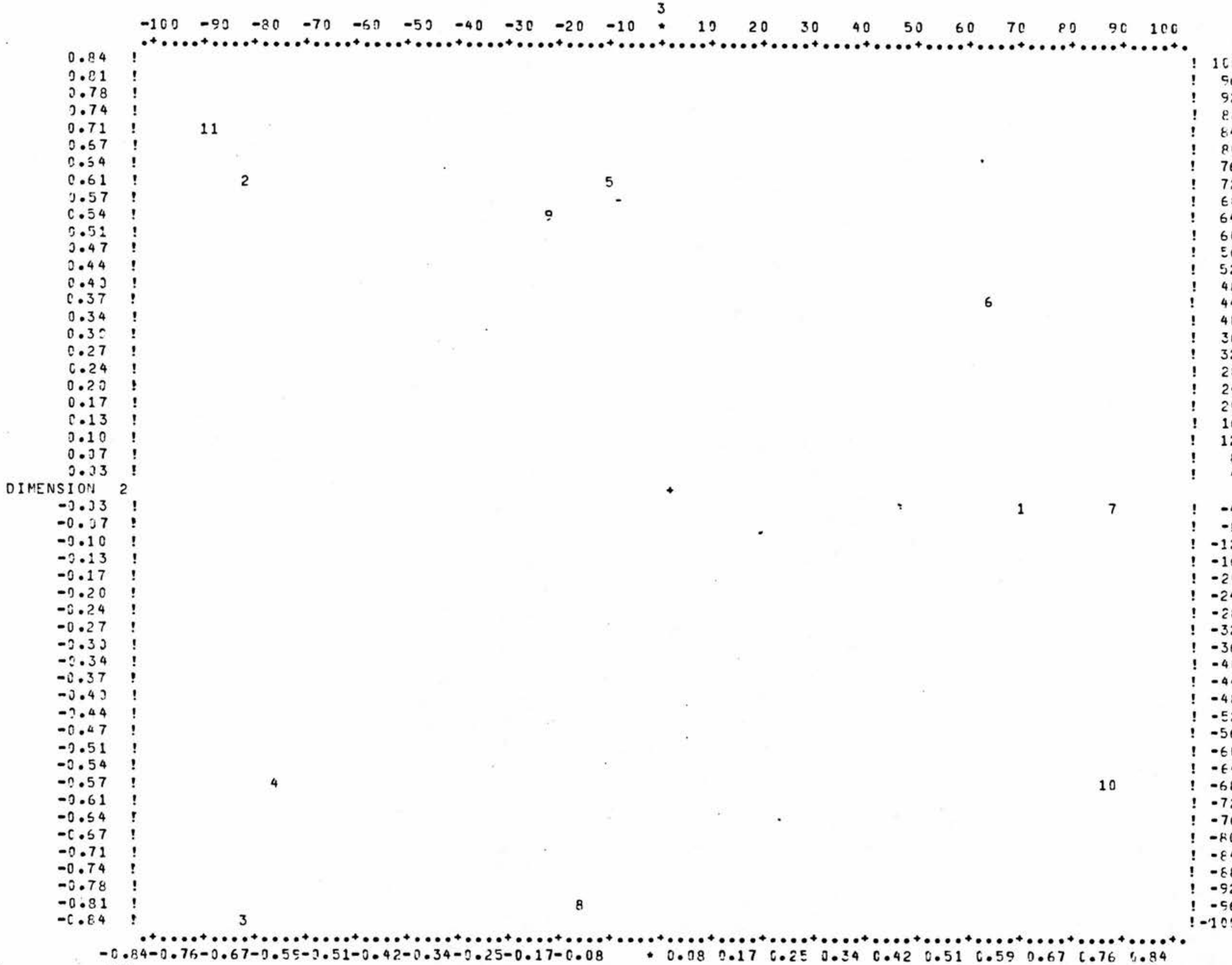


FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 1

6



FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 2



0
OK

SOLUTION IN 2 DIMENSIONS:
* *

8

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

```
RAW STRESS DHAT      =   0.569286
STRESS DHAT          =   0.076488
RAW STRESS DSTAR     =   1.510163
COEF. ALIEN. DSTAR   =   0.124336
```

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.170667

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 11
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 38

F I N A L   C O N F I G U R A T I O N

1	-0.6324	-0.5877
2	-0.3127	0.8885
3	0.7639	-0.6820
4	0.7532	-0.3248
5	0.5892	0.9347
6	0.8988	0.7751
7	-0.7739	-0.6339
8	0.8511	-0.6767
9	-0.7310	0.1819
10	-0.7480	-0.7332
11	-0.6582	0.8579
DMEAN	0.0000	0.0000
DSIGMA	0.7169	0.6971

OK2 KOWARERU

DISTANCES

7	1	0.1415	11	2	0.3455	10	1	0.1463	10	7	0.0994	8	3	0.0872
6	5	0.3096	5	2	0.9019	11	9	0.6760	4	3	0.3572	8	4	0.3519
9	1	0.7696	9	7	0.8158	9	2	0.7067	10	9	0.9151	6	3	1.4570
3	1	1.3963	8	6	1.4517	9	4	1.4842	4	2	1.2328	2	1	1.4761
6	4	1.0598	6	2	1.2115	11	5	1.2474	4	1	1.3857	5	4	1.2595
8	5	1.6113	3	2	1.5718	8	2	1.5688	10	8	1.5990	7	4	1.5271
8	1	1.4835	7	3	1.5378	5	3	1.6166	9	8	1.5822	9	3	1.4951
11	10	1.5912	11	7	1.4918	9	5	1.3203	9	6	1.6298	10	4	1.5012
11	6	1.5570	11	1	1.4456	11	4	1.4248	8	7	1.6250	11	8	1.6131
7	5	1.5909	10	6	1.6883	11	3	1.5923	10	2	1.6217	10	3	1.5119
5	1	1.5311	6	1	1.5596	7	2	1.5223	10	5	1.6774	7	6	1.6895

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1415	11	2	0.1696	10	1	0.1696	10	7	0.1696	8	3	0.1696
6	5	0.3096	5	2	0.5717	11	9	0.5717	4	3	0.5717	8	4	0.5717
9	1	0.7640	9	7	0.7640	9	2	0.7640	10	9	0.9151	6	3	1.3366
3	1	1.3366	8	6	1.3366	9	4	1.3366	4	2	1.3366	2	1	1.3366
6	4	1.3366	6	2	1.3366	11	5	1.3366	4	1	1.3366	5	4	1.3366
8	5	1.5308	3	2	1.5308	8	2	1.5308	10	8	1.5308	7	4	1.5308
8	1	1.5308	7	3	1.5308	5	3	1.5308	9	8	1.5308	9	3	1.5308
11	10	1.5308	11	7	1.5308	9	5	1.5308	9	6	1.5308	10	4	1.5308
11	6	1.5308	11	1	1.5308	11	4	1.5308	8	7	1.5846	11	8	1.5846
7	5	1.5846	10	6	1.5846	11	3	1.5846	10	2	1.5846	10	3	1.5846
5	1	1.5846	6	1	1.5846	7	2	1.5846	10	5	1.6774	7	6	1.6895

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

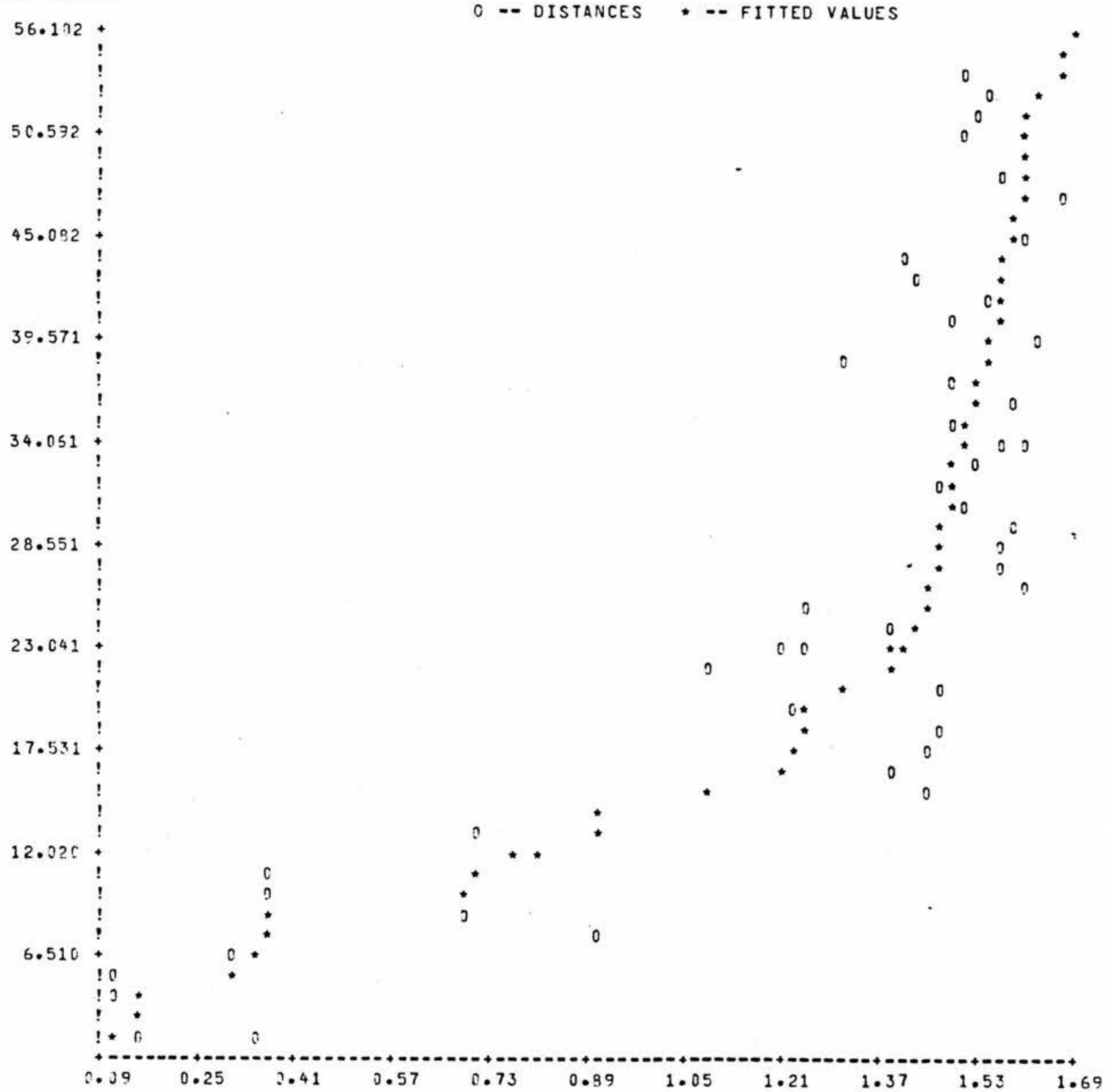
7	1	0.0872	11	2	0.0994	10	1	0.1415	10	7	0.1463	8	3	0.3096
6	5	0.3455	5	2	0.3519	11	9	0.3572	4	3	0.6760	8	4	0.7067
9	1	0.7695	9	7	0.8158	9	2	0.9019	10	9	0.9151	6	3	1.0998
3	1	1.2115	8	6	1.2328	9	4	1.2474	4	2	1.2595	2	1	1.3203
6	4	1.3857	6	2	1.3963	11	5	1.4248	4	1	1.4456	5	4	1.4517
8	5	1.4570	3	2	1.4761	8	2	1.4835	10	8	1.4842	7	4	1.4918
8	1	1.4951	7	3	1.5012	5	3	1.5119	9	8	1.5223	9	3	1.5271
11	10	1.5311	11	7	1.5379	9	5	1.5570	9	6	1.5596	10	4	1.5688
11	6	1.5718	11	1	1.5822	11	4	1.5823	8	7	1.5909	11	8	1.5912
7	5	1.5990	10	6	1.6113	11	3	1.6131	10	2	1.6166	10	3	1.6217
5	1	1.6250	6	1	1.6298	7	2	1.6774	10	5	1.6883	7	6	1.6895

===============

OK2

KOWARERU

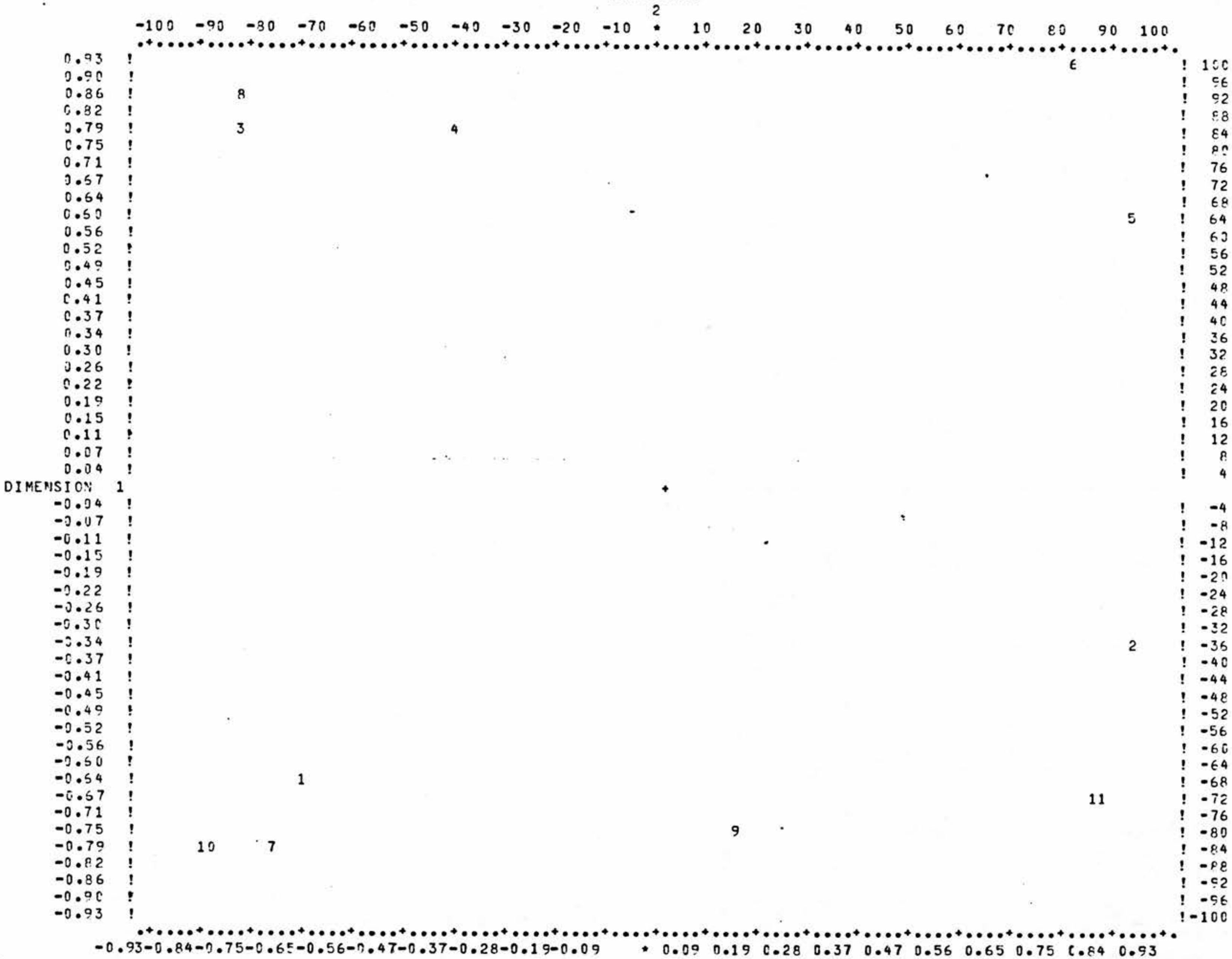
SIMILARITY



10K2
FINAL CONFIGURATION
DIMENSION 2 PLOTTED AGAINST DIMENSION 1

KOWARERU

//



1

10. FINISH

114

THE NETHERLANDS.

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+------------------------------------------------------------------------------+
:                                                                              :
:                         M  D  S  (X)  PROGRAMS                               :
:                                                                              :
:     AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND :
:     LANGUAGE.                                                                :
:                                                                              :
:     PROGRAMS AND SUPPORTING DOCUMENTATION       OTHER ENQUIRIES SHOULD       :
:     ARE DISTRIBUTED FROM                        BE ADDRESSED TO              :
:                                                                              :
:     MDS(X) PROJECT,                             MDS(X) PROJECT,              :
:     PROGRAM LIBRARY UNIT,                       SOCIOLOGICAL RESEARCH UNIT,  :
:     UNIVERSITY OF EDINBURGH,                    UNIVERSITY COLLEGE,          :
:     18 BUCCLEUCH PLACE,                         P.O. BOX 78,                 :
:     EDINBURGH EH8 9LN,                          CARDIFF CF1 1XL,             :
:     U.K.                                        U.K.                         :
:                                                                              :
:     USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN :
:     PUBLISHING RESULTS.                                                      :
:                                                                              :
+------------------------------------------------------------------------------+

        1.     RUN NAME       KOU1
        2.     TASK NAME      KOWARERU
        3.     £ OF STIMULI   11
        4.     PRINT DATA     YES
        5.     PARAMETERS     DATA TYPE(1),MINKOWSKI(11.0)
        6.     DIMENSION      2 TO 5
        7.     INPUT FORMAT   (10F5.0)
        8.     READ MATRIX

ROW  2  0.3850E+02

ROW  3  0.3250E+02  0.2100E+02

ROW  4  0.1750E+02  0.3250E+02  0.8000E+01

ROW  5  0.4900E+02  0.1100E+02  0.3250E+02  0.3500E+02

ROW  6  0.5300E+02  0.1600E+02  0.1300E+02  0.2250E+02  0.1000E+02

ROW  7  0.1000E+01  0.4450E+02  0.3250E+02  0.1750E+02  0.5100E+02  0.5450E+02

ROW  8  0.2700E+02  0.2700E+02  0.6000E+01  0.9000E+01  0.2700E+02  0.1950E+02
        0.4450E+02

ROW  9  0.1200E+02  0.7000E+01  0.4050E+02  0.2700E+02  0.2700E+02  0.4450E+02
        0.1400E+02  0.3650E+02

ROW 10  0.3000E+01  0.3850E+02  0.4450E+02  0.3650E+02  0.5200E+02  0.5450E+02
        0.2000E+01  0.4450E+02  0.1500E+02

ROW 11  0.2700E+02  0.5000E+01  0.4450E+02  0.5000E+02  0.1950E+02  0.4050E+02
        0.2700E+02  0.4800E+02  0.4000E+01  0.2250E+02

  10 ROWS ARE READ.
        9.     COMPUTE
```

775

2

SOLUTION IN 3 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

RAW STRESS DHAT	=	0.051376
STRESS DHAT	=	0.024107
RAW STRESS DSTAR	=	0.115327
COEF. ALIEN. DSTAR	=	0.036112

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE, MBR 1979 V14) = 0.138224

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 7
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 32

776

F I N A L   C O N F I G U R A T I O N

1	0.8867	0.2229	0.1759
2	-0.2923	-0.5286	-0.1679
3	-0.3229	0.7153	0.0827
4	-0.0745	0.7267	-0.3842
5	-0.9562	-0.5318	0.2220
6	-1.1667	-0.0930	0.7757
7	0.9773	0.2213	0.2771
8	-0.4547	0.7017	-0.3831
9	0.2114	-0.5609	-0.5521
10	1.1001	0.1578	0.3764
11	0.0918	-1.0314	-0.4225
OMEAN	0.0000	0.0000	0.0000
OSIGMA	0.7187	0.5725	0.3946

DISTANCES

7	1	0.1036	10	7	0.1239	10	1	0.2215	11	9	0.4705	11	2	0.5051
8	3	0.4658	9	2	0.5060	4	3	0.4669	8	4	0.3802	6	5	0.5574
5	2	0.6641	9	1	0.8197	6	3	0.8873	9	7	0.8808	10	9	0.9732
6	2	0.9749	4	1	0.9615	7	4	1.0524	11	5	1.0484	8	6	1.1609
3	2	1.2439	6	4	1.2062	11	10	1.2068	9	5	1.1688	8	2	1.2304
8	5	1.2336	11	1	1.2550	11	7	1.2554	9	4	1.2876	8	1	1.3414
3	1	1.2096	5	3	1.2471	4	2	1.2553	7	3	1.3002	5	4	1.2607
10	4	1.1756	9	8	1.2628	2	1	1.1797	10	2	1.3925	9	3	1.2763
11	6	1.3150	7	2	1.2699	10	3	1.4230	8	7	1.4320	9	6	1.4434
10	8	1.5549	11	3	1.7467	11	8	1.7331	5	1	1.8429	11	4	1.7581
7	5	1.9335	10	5	2.0563	6	1	2.0533	7	6	2.1439	10	6	2.2668

OU1 KOWARERU

3

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1036	10	7	0.1239	10	1	0.2215	11	9	0.4657	11	2	0.4657
8	3	0.4657	9	2	0.4657	4	3	0.4657	8	4	0.4657	6	5	0.5574
5	2	0.6641	9	1	0.8197	6	3	0.8840	9	7	0.8840	10	9	0.9699
6	2	0.9699	4	1	0.9699	7	4	1.0504	11	5	1.0504	8	6	1.1609
3	2	1.2064	6	4	1.2064	11	10	1.2064	9	5	1.2064	8	2	1.2304
8	5	1.2336	11	1	1.2525	11	7	1.2525	9	4	1.2525	8	1	1.2525
3	1	1.2525	5	3	1.2525	4	2	1.2525	7	3	1.2525	5	4	1.2525
10	4	1.2525	9	8	1.2525	2	1	1.2525	10	2	1.3134	9	3	1.3134
11	6	1.3134	7	2	1.3134	10	3	1.4230	8	7	1.4320	9	6	1.4434
10	8	1.5549	11	3	1.7399	11	8	1.7399	5	1	1.8005	11	4	1.8005
7	5	1.9335	10	5	2.0548	6	1	2.0548	7	6	2.1439	10	6	2.2668

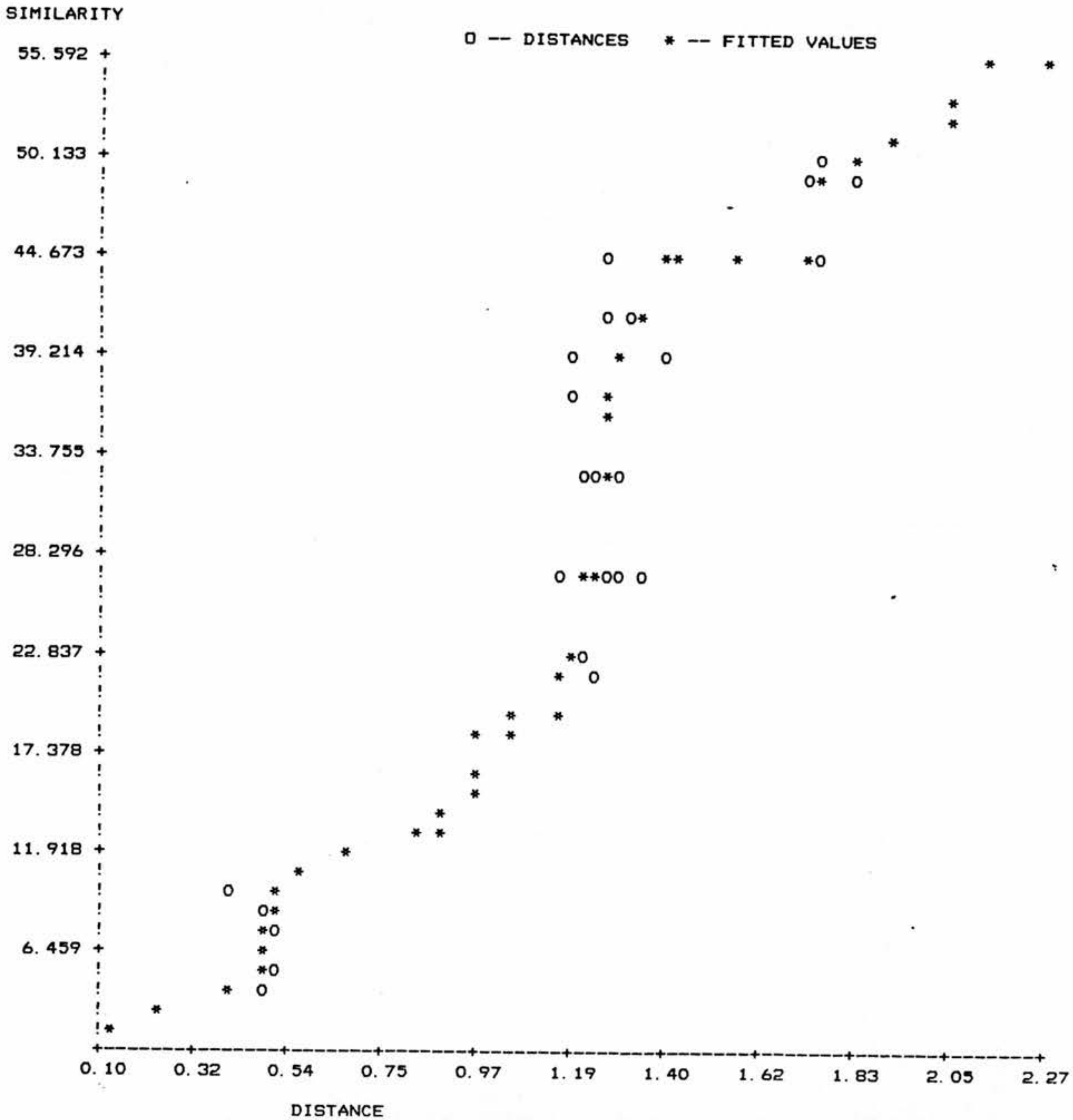
PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.1036	10	7	0.1239	10	1	0.2215	11	9	0.3802	11	2	0.4658
8	3	0.4669	9	2	0.4705	4	3	0.5051	8	4	0.5060	6	5	0.5574
5	2	0.6641	9	1	0.8197	6	3	0.8808	9	7	0.8873	10	9	0.9615
6	2	0.9732	4	1	0.9749	7	4	1.0484	11	5	1.0524	8	6	1.1609
3	2	1.1688	6	4	1.1756	11	10	1.1797	9	5	1.2062	8	2	1.2068
8	5	1.2096	11	1	1.2304	11	7	1.2336	9	4	1.2439	8	1	1.2471
3	1	1.2550	5	3	1.2553	4	2	1.2554	7	3	1.2607	5	4	1.2628
10	4	1.2699	9	8	1.2763	2	1	1.2876	10	2	1.3002	9	3	1.3150
11	6	1.3414	7	2	1.3925	10	3	1.4230	8	7	1.4320	9	6	1.4434
10	8	1.5549	11	3	1.7331	11	8	1.7467	5	1	1.7581	11	4	1.8429
7	5	1.9335	10	5	2.0533	6	1	2.0563	7	6	2.1439	10	6	2.2668

4

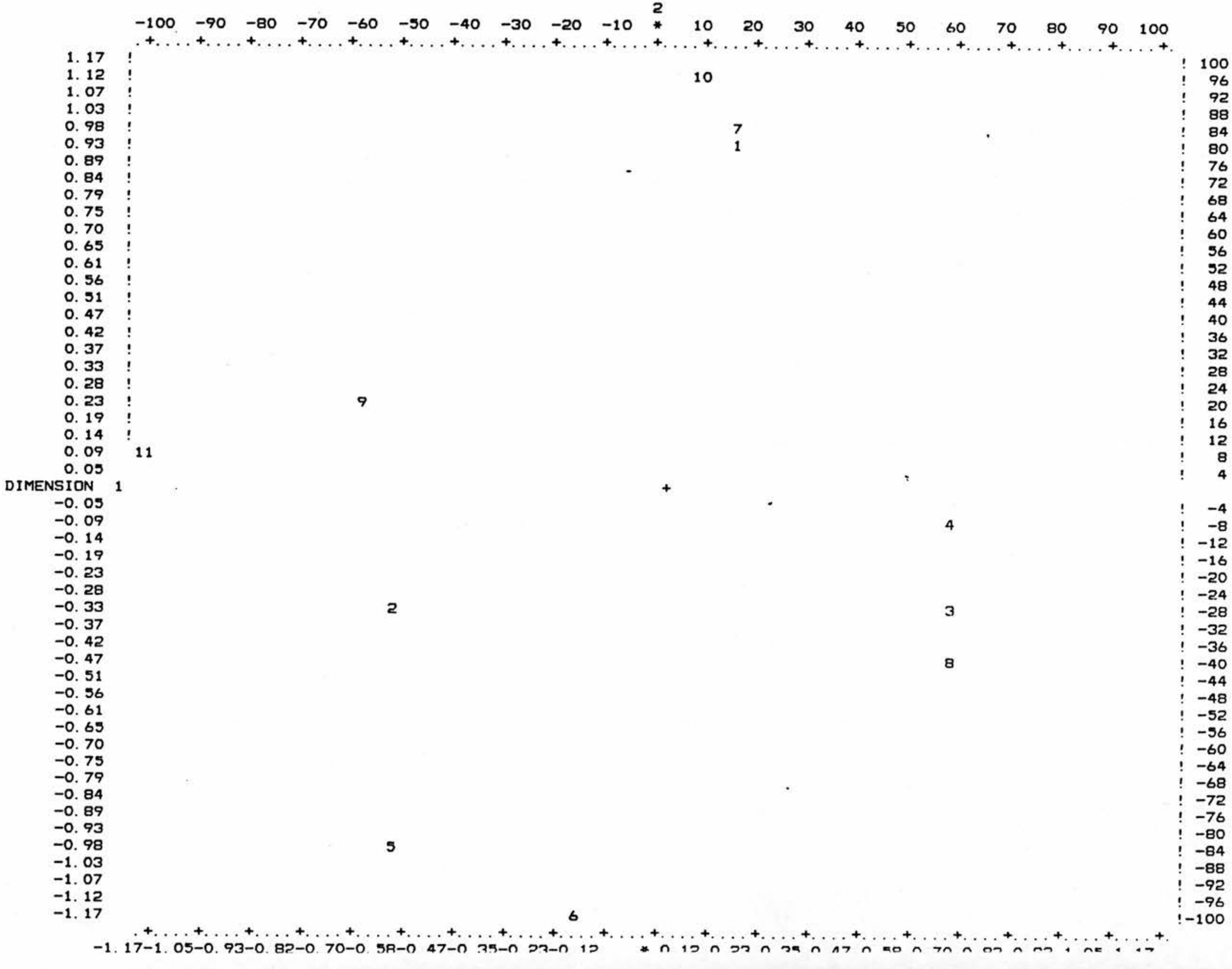
OU1

KOWARERU



5

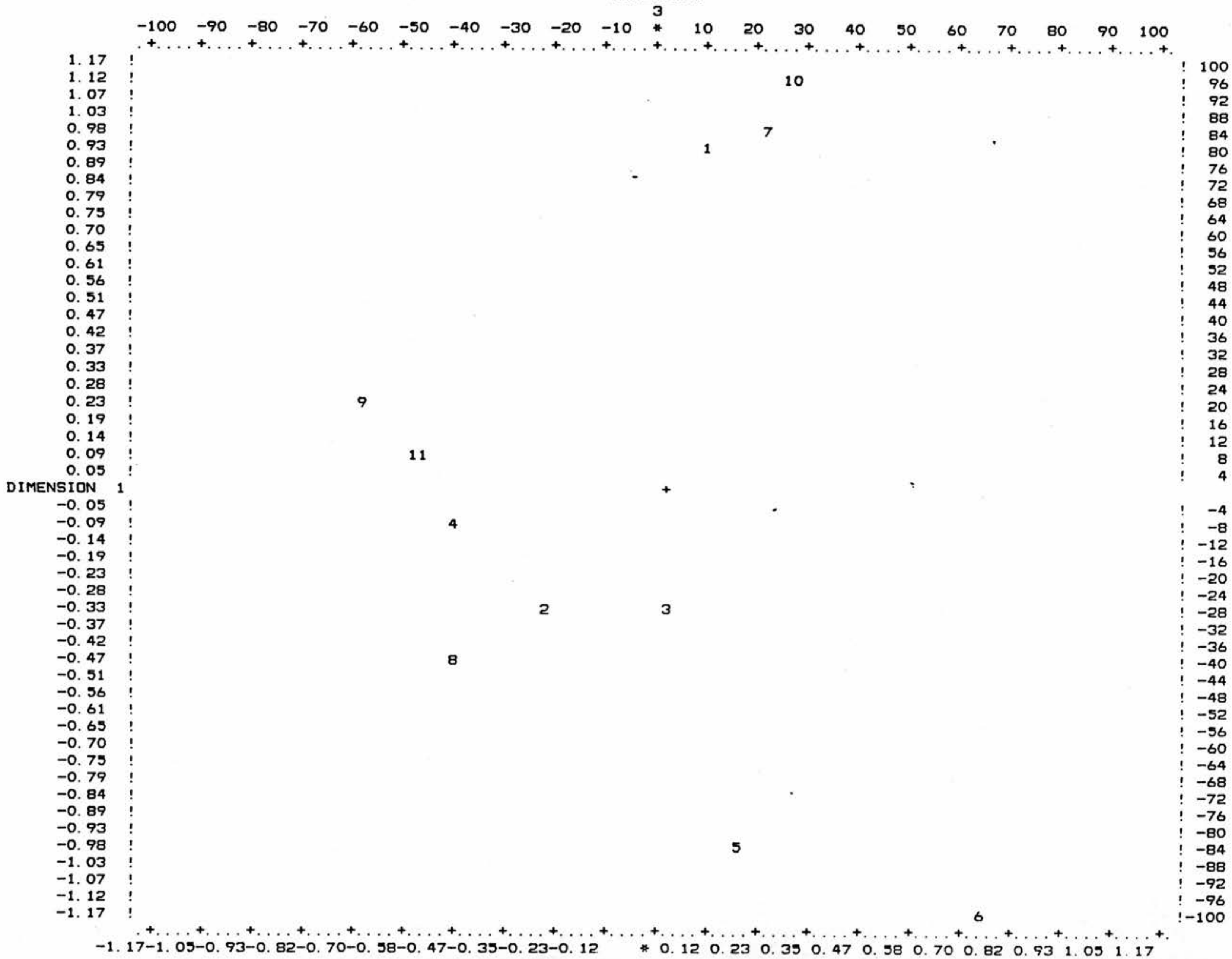
FINAL CONFIGURATION
DIMENSION 2 PLOTTED AGAINST DIMENSION 1



779

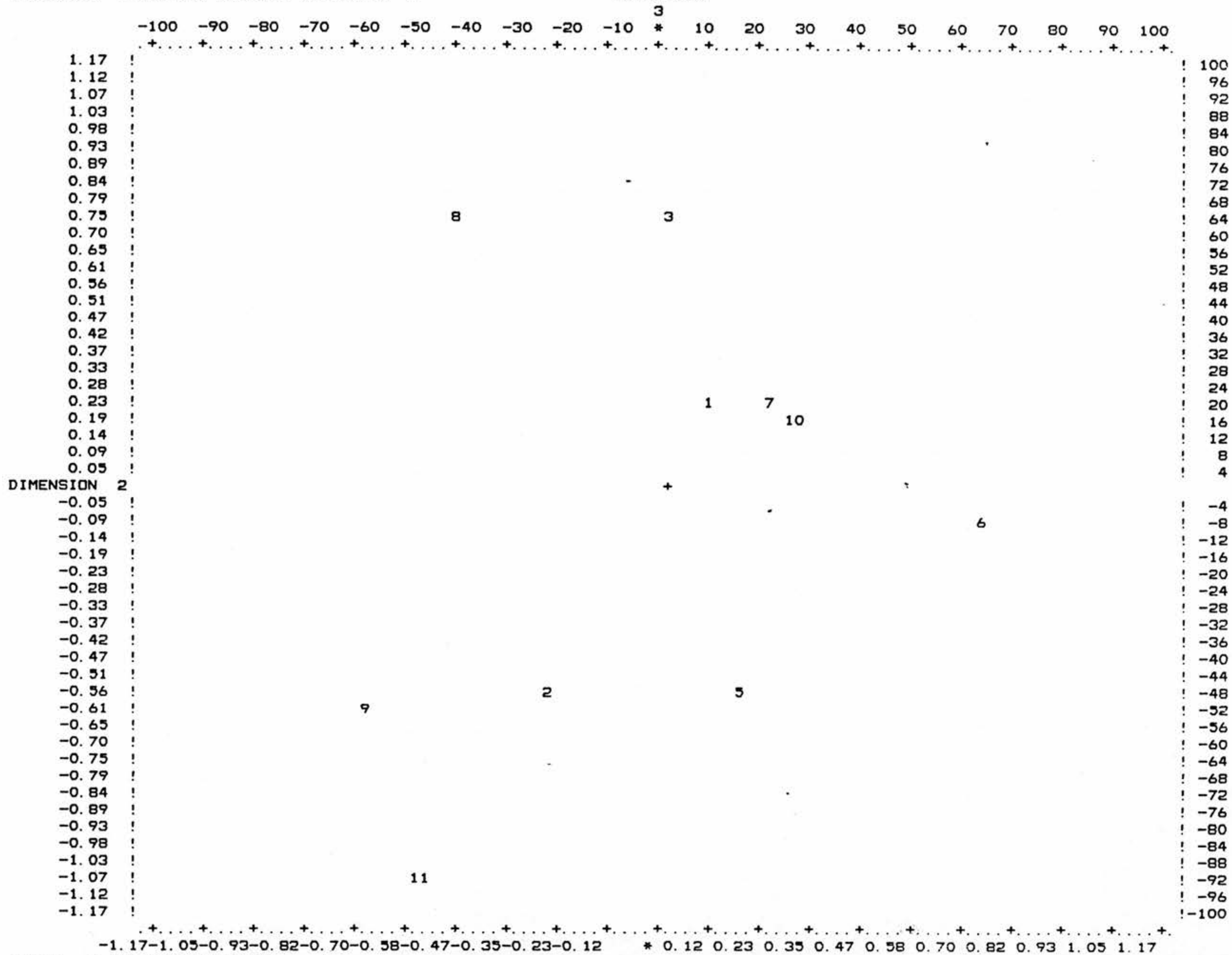
6

FINAL CONFIGURATIUN
DIMENSION 3 PLOTTED AGAINST DIMENSION 1



7

FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 2



781

1OU1 KOWARERU 8

SOLUTION IN 2 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

```
RAW STRESS DHAT      =     0.135599
STRESS DHAT          =     0.036657
RAW STRESS DSTAR     =     0.320439
COEF. ALIEN. DSTAR   =     0.056328
```

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE, MBR 1979 V14) = 0.170667

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 6
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 28

782

F I N A L   C O N F I G U R A T I O N

1	0.9663	0.4095
2	-0.2524	-0.6287
3	-0.3420	0.6946
4	-0.0777	0.7622
5	-0.9865	-0.6420
6	-1.3284	-0.3185
7	1.0526	0.3957
8	-0.4952	0.7339
9	0.1804	-0.6560
10	1.2199	0.2232
11	0.0630	-0.9739
OMEAN	0.0000	0.0000
OSIGMA	0.7825	0.6226

OU1 KOWARERU

DISTANCES

7	1	0.0864	10	7	0.1812	10	1	0.2544	11	9	0.3180	11	2	0.3553
8	3	0.1532	9	2	0.4328	4	3	0.2643	8	4	0.4175	6	5	0.3557
5	2	0.7341	9	1	1.0688	6	3	1.0657	9	7	1.0633	10	9	1.0535
6	2	1.0760	4	1	1.0440	7	4	1.1303	11	5	1.0495	8	6	1.0595
3	2	1.3233	11	10	1.2554	6	4	1.2717	9	5	1.1668	8	2	1.3626
11	7	1.3731	8	5	1.3759	11	1	1.3846	9	4	1.4182	8	1	1.4614
3	1	1.3082	5	3	1.3366	4	2	1.3909	7	3	1.3946	5	4	1.4052
10	4	1.2977	9	8	1.3899	2	1	1.2363	10	2	1.4727	9	3	1.3505
11	6	1.3915	7	2	1.3131	9	6	1.5088	8	7	1.5478	10	3	1.5619
11	3	1.6685	10	8	1.7151	11	8	1.7078	5	1	1.9529	11	4	1.7361
7	5	2.0392	10	5	2.2064	6	1	2.2947	7	6	2.3811	10	6	2.5484

783 OU1 KOWARERU 9

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0864	10	7	0.1812	10	1	0.2544	11	9	0.2755	11	2	0.2755
8	3	0.2755	9	2	0.3485	4	3	0.3485	8	4	0.3866	6	5	0.3866
5	2	0.7341	9	1	1.0619	6	3	1.0619	9	7	1.0619	10	9	1.0619
6	2	1.0619	4	1	1.0619	7	4	1.0798	11	5	1.0798	8	6	1.0798
3	2	1.2543	11	10	1.2543	6	4	1.2543	9	5	1.2543	8	2	1.3626
11	7	1.3671	8	5	1.3671	11	1	1.3671	9	4	1.3671	8	1	1.3671
3	1	1.3671	5	3	1.3671	4	2	1.3671	7	3	1.3671	5	4	1.3671
10	4	1.3671	9	8	1.3671	2	1	1.3671	10	2	1.3819	9	3	1.3819
11	6	1.3819	7	2	1.3819	9	6	1.5088	8	7	1.5478	10	3	1.5619
11	3	1.6685	10	8	1.7115	11	8	1.7115	5	1	1.8445	11	4	1.8445
7	5	2.0392	10	5	2.2064	6	1	2.2947	7	6	2.3811	10	6	2.5484

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

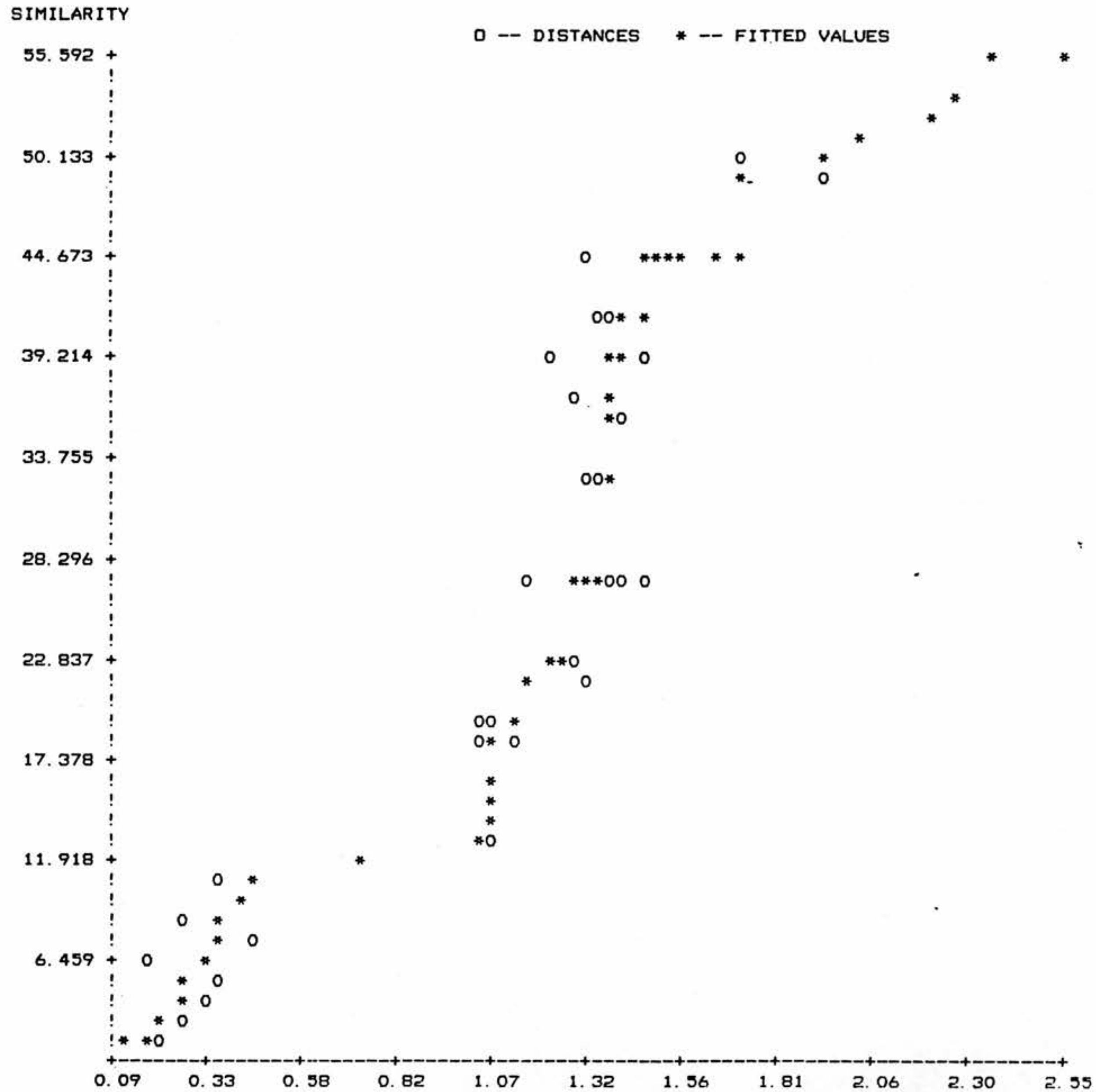
7	1	0.0864	10	7	0.1532	10	1	0.1812	11	9	0.2544	11	2	0.2643
8	3	0.3180	9	2	0.3553	4	3	0.3557	8	4	0.4175	6	5	0.4328
5	2	0.7341	9	1	1.0440	6	3	1.0495	9	7	1.0535	10	9	1.0595
6	2	1.0633	4	1	1.0657	7	4	1.0688	11	5	1.0760	8	6	1.1303
3	2	1.1668	11	10	1.2363	6	4	1.2554	9	5	1.2717	8	2	1.2977
11	7	1.3082	8	5	1.3131	11	1	1.3233	9	4	1.3366	8	1	1.3505
3	1	1.3626	5	3	1.3731	4	2	1.3759	7	3	1.3846	5	4	1.3899
10	4	1.3909	9	8	1.3915	2	1	1.3946	10	2	1.4052	9	3	1.4182
11	6	1.4614	7	2	1.4727	9	6	1.5088	8	7	1.5478	10	3	1.5619
11	3	1.6685	10	8	1.7078	11	8	1.7151	5	1	1.7361	11	4	1.9529
7	5	2.0392	10	5	2.2064	6	1	2.2947	7	6	2.3811	10	6	2.5484

10

1 SHEPARD DIAGRAM

OU1

KOWARERU



784

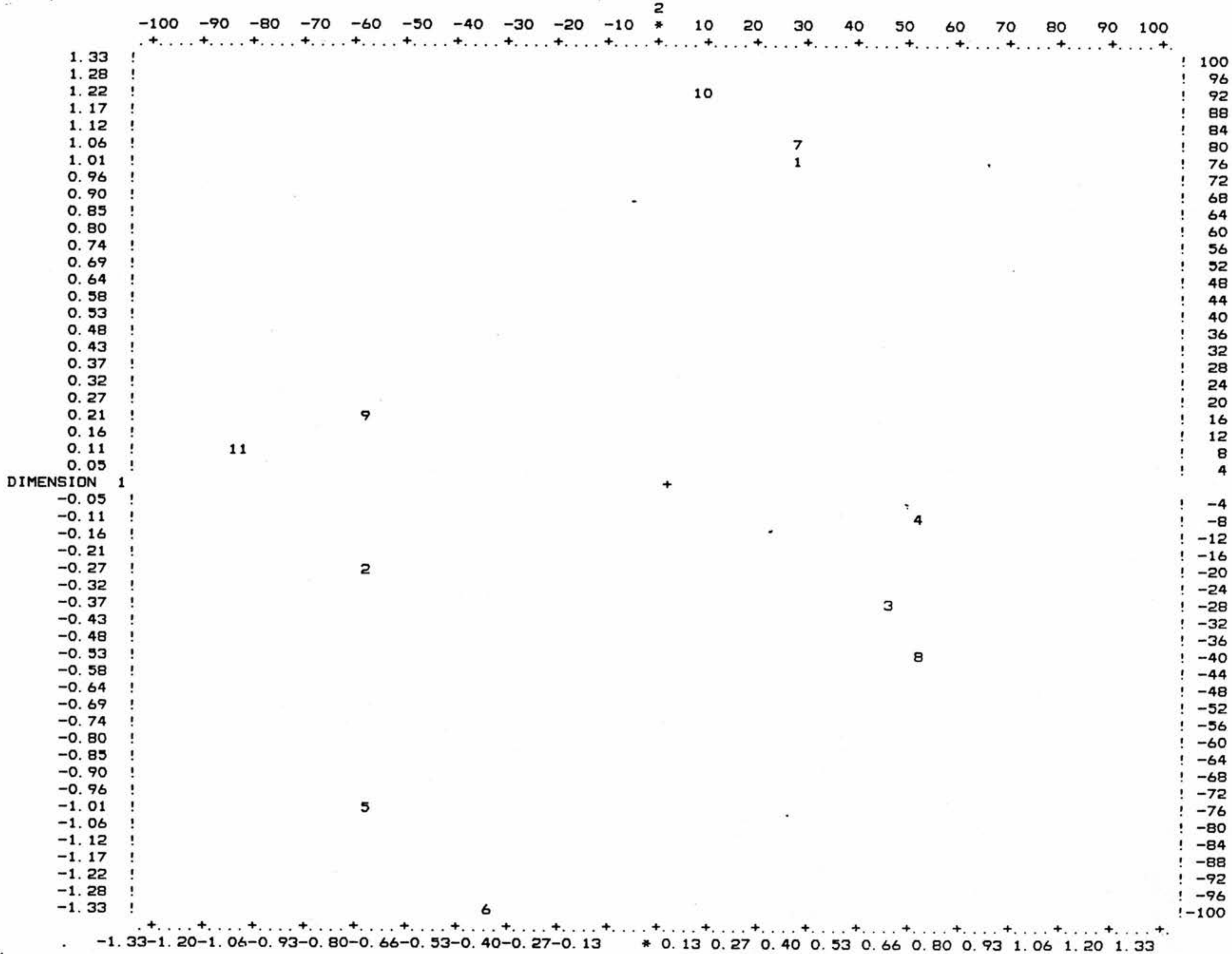
11

10U1

KOWARERU

FINAL CONFIGURATION

DIMENSION 2 PLOTTED AGAINST DIMENSION 1



185

1

10 FINISH

```
+------------------------------------------------------------------------------------+
|                                                                                    |
|                               M  D  S  (X)  PROGRAMS                               |
|                                                                                    |
|     AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND |
|     LANGUAGE.                                                                      |
|                                                                                    |
|     PROGRAMS AND SUPPORTING DOCUMENTATION        OTHER ENQUIRIES SHOULD            |
|     ARE DISTRIBUTED FROM                         BE ADDRESSED TO                   |
|                                                                                    |
|     MDS(X) PROJECT,                              MDS(X) PROJECT,                   |
|     PROGRAM LIBRARY UNIT,                        SOCIOLOGICAL RESEARCH UNIT,       |
|     UNIVERSITY OF EDINBURGH,                     UNIVERSITY COLLEGE,               |
|     18 BUCCLEUCH PLACE,                          P.O. BOX 78,                      |
|     EDINBURGH EH8 9LN,                           CARDIFF CF1 1XL,                  |
|     U.K.                                         U.K.                              |
|                                                                                    |
|     USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN   |
|     PUBLISHING RESULTS.                                                            |
|                                                                                    |
+------------------------------------------------------------------------------------+

        1.      RUN NAME         KOUN2
        2.      TASK NAME         KOWAPERU
        3.      £ OF STIMULI      11
        4.      PRINT DATA        YES
        5.      PARAMETERS        DATA TYPE(1) MINKOWSKI(11.0)
        6.      DIMENSION          2 TO 5
        7.      INPUT FORMAT      (10F5.0)
        8.      READ MATRIX

ROW  2  0.3900E+02

ROW  3  0.3300E+02  0.2700E+02

ROW  4  0.1700E+02  0.2600E+02  0.1000E+02

ROW  5  0.5000E+02  0.1100E+02  0.2400E+02  0.3700E+02

ROW  6  0.5100E+02  0.1500E+02  0.1400E+02  0.2800E+02  0.8000E+01

ROW  7  0.1000E+01  0.4350E+02  0.2900E+02  0.2000E+02  0.5250E+02  0.5500E+02

ROW  8  0.3400E+02  0.3000E+02  0.7000E+01  0.9000E+01  0.2500E+02  0.1900E+02
        0.4100E+02

ROW  9  0.1200E+02  0.6000E+01  0.3500E+02  0.3200E+02  0.2200E+02  0.4800E+02
        0.1300E+02  0.3600E+02

ROW 10  0.3000E+01  0.3800E+02  0.4000E+02  0.4700E+02  0.5250E+02  0.5400E+02
        0.4000E+01  0.4500E+02  0.1800E+02

ROW 11  0.2300E+02  0.5000E+01  0.4600E+02  0.4900E+02  0.1600E+02  0.4200E+02
        0.3100E+02  0.4350E+02  0.2000E+01  0.2100E+02

   10 ROWS ARE READ.
        9.      COMPUTE
```

```
SOLUTION IN  3 DIMENSIONS:
 *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM  DESCRIPTION)

RAW STRESS DHAT      =     0.000403
STRESS DHAT          =     0.002229
RAW STRESS DSTAR     =     0.000979
COEF. ALIEN. DSTAR   =     0.003472

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA  (SPENCE,MBR 1979 V14) =    0.138224

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION  36
OPTIMAL SOLUTION USING DHAT  WAS REACHED AFTER ITERATION  81


F I N A L   C O N F I G U R A T I O N
    1     0.9137     0.5490    -0.3551
    2    -0.2106    -0.6321     0.5790
    3    -0.3072     0.5923    -0.2697
    4    -0.2657     0.5935     0.5200
    5    -1.0090    -0.6304    -0.2031
    6    -1.0090    -0.5875    -0.5930
    7     0.9230     0.5572    -0.3252
    8    -0.3149     0.5935     0.1252
    9     0.1788    -0.6278     0.5663
   10     0.9304     0.2501    -0.6103
   11     0.1706    -0.6576     0.5707
OMEAN   0.0000     0.0000     0.0000
OSIGMA  0.6714     0.5798     0.4616
```



```
DISTANCES

  7  1  0.0299   11  9  0.0298   10  1  0.3034   10  7  0.3175   11  2  0.3812
  9  2  0.3895    8  3  0.3949    6  5  0.3949    8  4  0.3948    4  3  0.7897
  5  2  0.8421    9  1  1.1845    9  7  1.1902    6  3  1.1802    6  2  1.1786
 11  5  1.1806    4  1  1.1834   10  9  1.1815    8  6  1.1818    7  4  1.1912
 11 10  1.1876    9  5  1.1887   11  1  1.2130    5  3  1.2230    8  5  1.2241
  4  2  1.2256    3  2  1.2263    6  4  1.2293    7  3  1.2302    8  2  1.2255
 11  7  1.2192    9  4  1.2214    3  1  1.2209    8  1  1.2286    9  3  1.2219
  9  8  1.2213    5  4  1.2247   10  2  1.2462    2  1  1.2366   10  3  1.2376
  8  7  1.2379   11  6  1.2507    7  2  1.2439   11  8  1.2511   10  8  1.2456
 11  3  1.2514   10  4  1.2438    9  6  1.2532   11  4  1.2512    5  1  1.9234
  6  1  1.9232    7  5  1.9328   10  5  1.9393   10  6  1.9394    7  6  1.9325
```

787

OUN2 KOWARERU

3

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0298	11	9	0.0295	10	1	0.3034	10	7	0.3175	11	2	0.3812
9	2	0.3895	8	3	0.3949	6	5	0.3949	8	4	0.3949	4	3	0.7897
5	2	0.8421	9	1	1.1826	9	7	1.1826	6	3	1.1826	6	2	1.1826
11	5	1.1826	4	1	1.1826	10	9	1.1826	8	6	1.1825	7	4	1.1892
11	10	1.1892	9	5	1.1892	11	1	1.2130	5	3	1.2230	8	5	1.2241
4	2	1.2246	3	2	1.2246	6	4	1.2246	7	3	1.2246	8	2	1.2246
11	7	1.2246	9	4	1.2245	3	1	1.2246	8	1	1.2246	9	3	1.2246
9	8	1.2246	5	4	1.2247	10	2	1.2396	2	1	1.2396	10	3	1.2396
8	7	1.2396	11	6	1.2473	7	2	1.2473	11	8	1.2480	10	8	1.2480
11	3	1.2480	10	4	1.2480	9	6	1.2522	11	4	1.2522	5	1	1.9233
6	1	1.9233	7	5	1.9328	10	5	1.9371	10	6	1.9371	7	6	1.9371

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0298	11	9	0.0299	10	1	0.3034	10	7	0.3175	11	2	0.3812
9	2	0.3895	8	3	0.3948	6	5	0.3949	8	4	0.3949	4	3	0.7897
5	2	0.8421	9	1	1.1786	9	7	1.1802	6	3	1.1806	6	2	1.1815
11	5	1.1818	4	1	1.1834	10	9	1.1845	8	6	1.1876	7	4	1.1887
11	10	1.1902	9	5	1.1912	11	1	1.2130	5	3	1.2192	8	5	1.2209
4	2	1.2213	3	2	1.2214	6	4	1.2219	7	3	1.2230	8	2	1.2241
11	7	1.2247	9	4	1.2255	3	1	1.2256	8	1	1.2263	9	3	1.2286
9	8	1.2293	5	4	1.2302	10	2	1.2366	2	1	1.2376	10	3	1.2379
8	7	1.2438	11	6	1.2439	7	2	1.2456	11	8	1.2462	10	8	1.2507
11	3	1.2511	10	4	1.2512	9	6	1.2514	11	4	1.2532	5	1	1.9232
6	1	1.9234	7	5	1.9325	10	5	1.9328	10	6	1.9395	7	6	1.9394

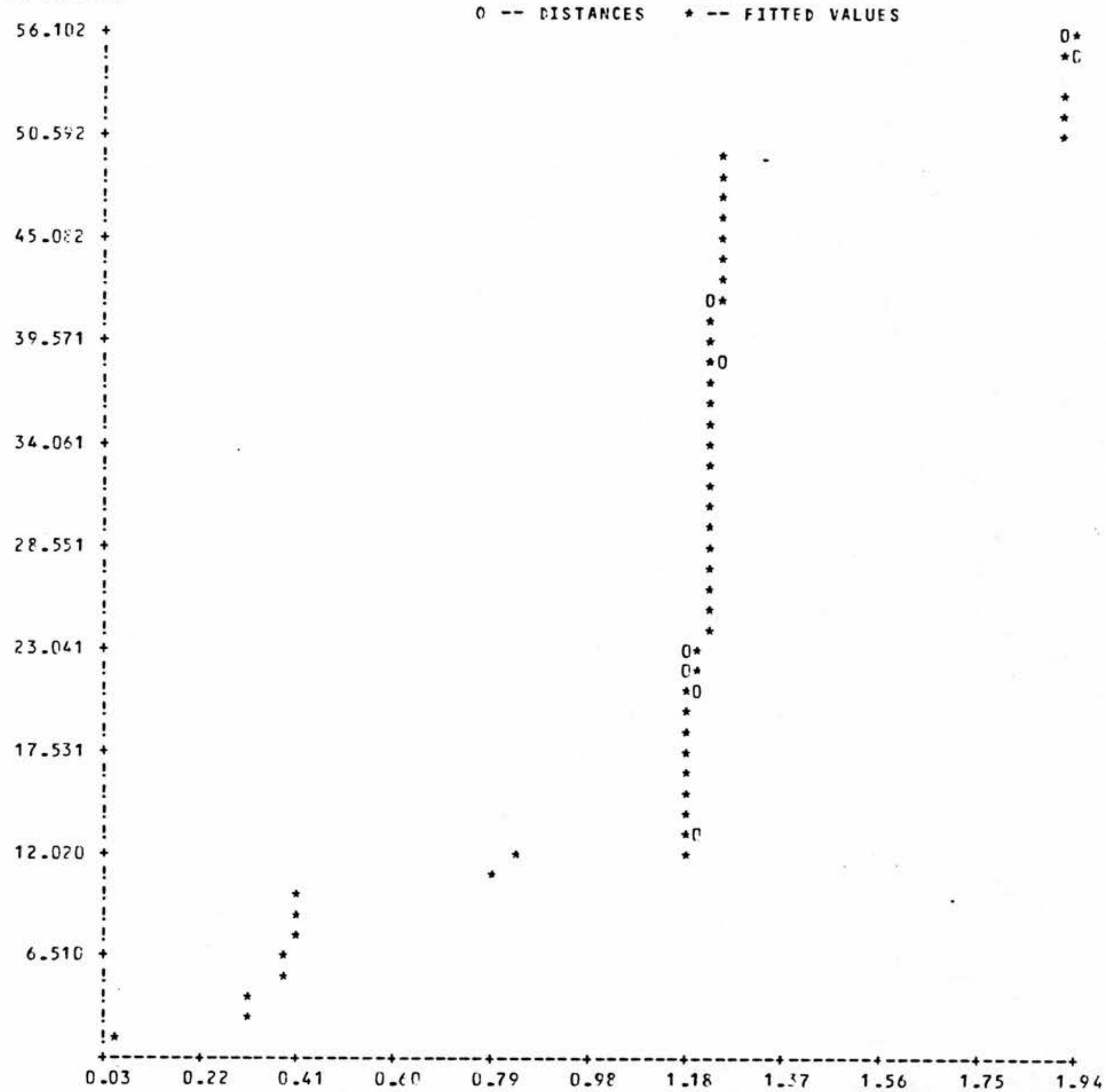
1 SHEPARD DIAGRAM

4

OUN2

KOWARERU

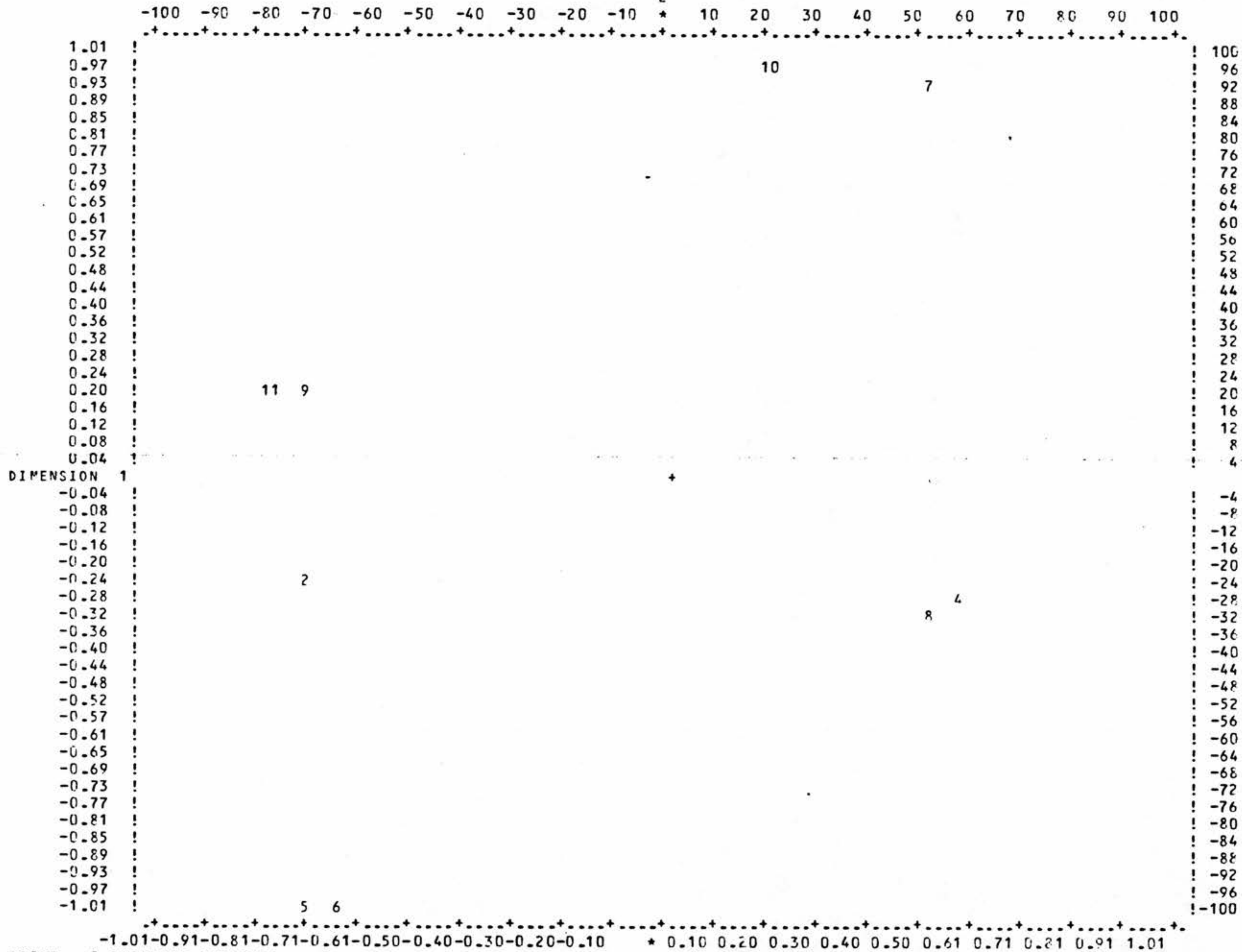
SIMILARITY



5

1OUN2
FINAL CONFIGURATION
DIMENSION 2 PLOTTED AGAINST DIMENSION 1

KOWARERU



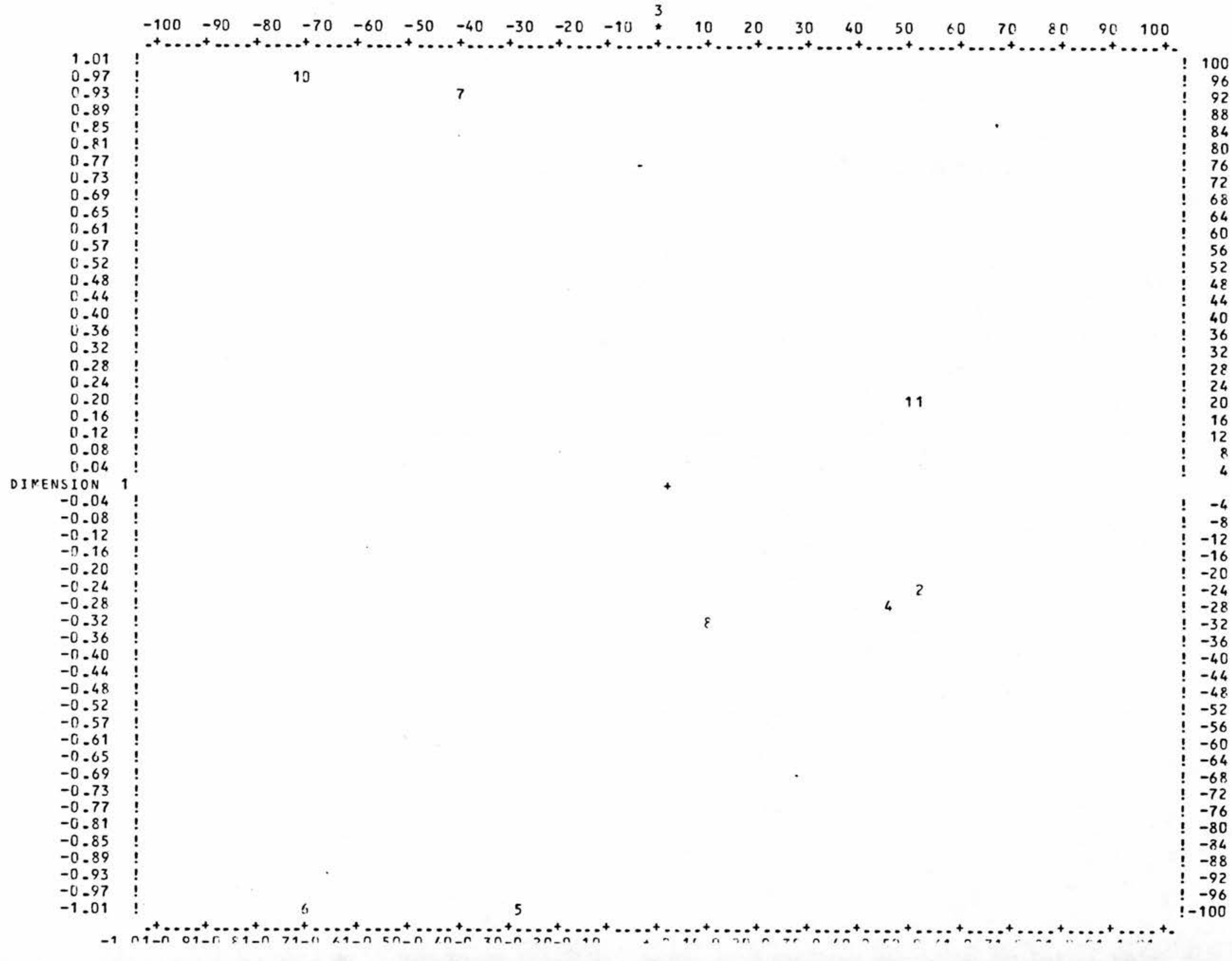
POINT 8 OVERLAYS POINT(S) 3

790

1OUN2.
FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 1

KOWARERU

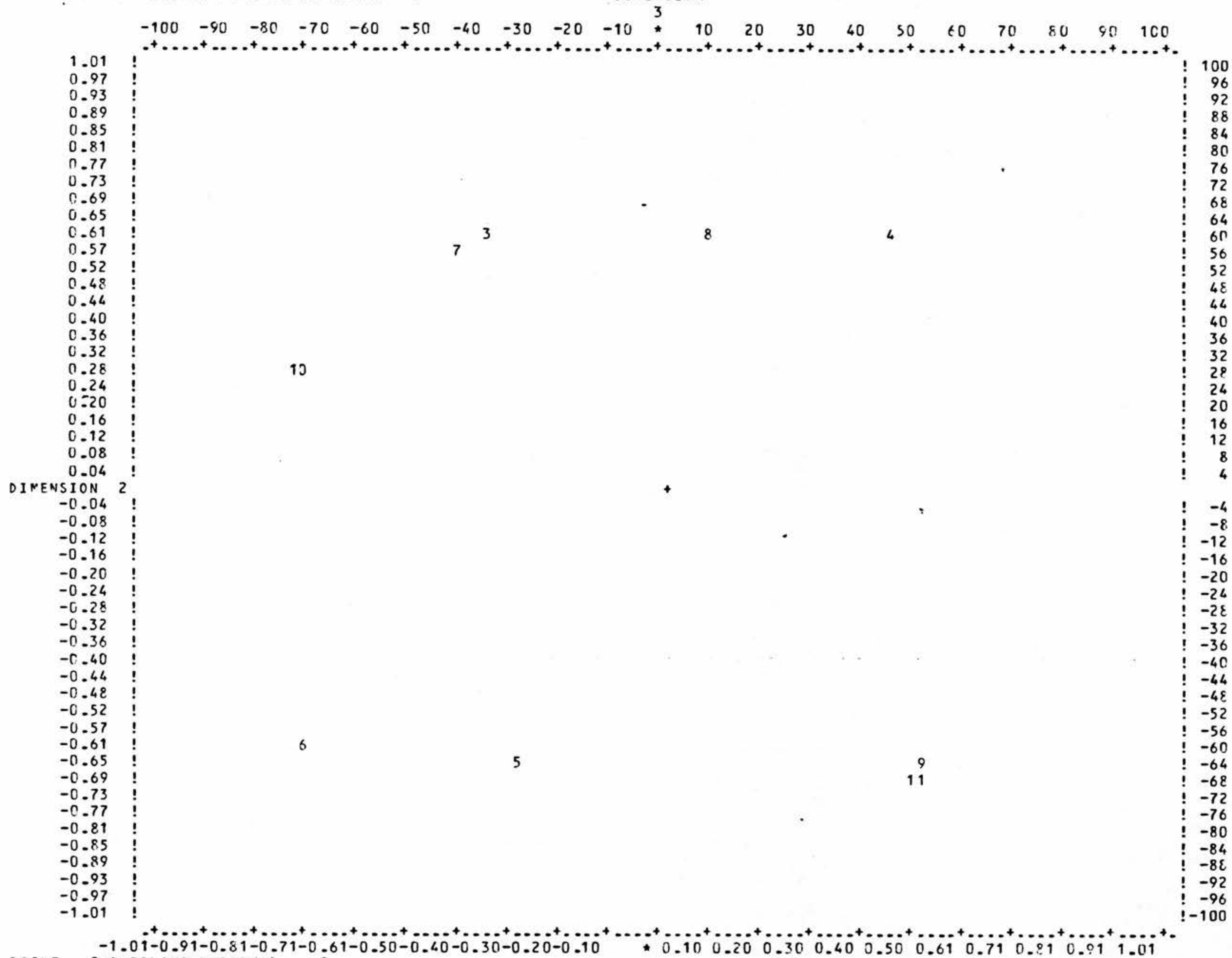
6



791

1OUN2 KOWARERU 7

FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 2



POINT 9 OVERLAYS POINT(S) 2
POINT 7 OVERLAYS POINT(S) 1

8

793

```
1OUN2                                                                   KOWARERU

 SOLUTION IN  2 DIMENSIONS:
  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

 FIT= DSTAR; ALGORITHM= SOFT SQUEEZE; (SEE PROGRAM  DESCRIPTION)

 RAW STRESS DHAT      =      0.000000
 STRESS DHAT          =      0.000003
 RAW STRESS DSTAR     =      0.000000
 COEF. ALIEN. DSTAR   =      0.000004

 STRESS1 BASED ON APPROXIMATION TO RANDOM DATA  (SPENCE,MBR 1979 V14) =     0.170667

 OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION  54
 OPTIMAL SOLUTION USING DHAT  WAS REACHED AFTER ITERATION  54


 F I N A L   C O N F I G U R A T I O N
      1      1.0103      0.5951
      2      0.1010     -0.7163
      3     -0.3031      0.5972
      4     -0.3031      0.5972
      5     -1.2124     -0.7141
      6     -1.2124     -0.7141
      7      1.0103      0.5951
      8     -0.3031      0.5972
      9      0.1011     -0.7162
     10      1.0103      0.5951
     11      0.1011     -0.7163
OMEAN     0.0000      0.0000
OSIGMA    0.7573      0.6531


 OUN2                                                                   KOWARERU

  DISTANCES

    7  1  0.0000   11  9  0.0000   10  1  0.0000   10  7  0.0000   11  2  0.0000
    9  2  0.0000    8  3  0.0000    6  5  0.0000    8  4  0.0000    4  3  0.0000
    5  2  1.3134    9  1  1.3135    9  7  1.3135    6  3  1.3135    6  2  1.3135
   11  5  1.3135    4  1  1.3135   10  9  1.3135    8  6  1.3135    7  4  1.3135
   11 10  1.3135    9  5  1.3135   11  1  1.3135    5  3  1.3135    8  5  1.3135
    4  2  1.3135    3  2  1.3135    6  4  1.3135    7  3  1.3135    8  2  1.3135
   11  7  1.3135    9  4  1.3135    3  1  1.3135    8  1  1.3135    9  3  1.3135
    9  8  1.3135    5  4  1.3135   10  2  1.3135    2  1  1.3135   10  3  1.3135
    8  7  1.3135   11  6  1.3135    7  2  1.3135   11  8  1.3135   10  8  1.3135
   11  3  1.3135   10  4  1.3135    9  6  1.3135   11  4  1.3135    5  1  2.2233
    6  1  2.2233    7  5  2.2233   10  5  2.2233   10  6  2.2233    7  6  2.2233
```

794

OUN2 KOWARERU

9

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0000	11	9	0.0000	10	1	0.0000	10	7	0.0000	11	2	0.0000
9	2	0.0000	8	3	0.0000	6	5	0.0000	8	4	0.0000	4	3	0.0000
5	2	1.3134	9	1	1.3135	9	7	1.3135	6	3	1.3135	6	2	1.3135
11	5	1.3135	4	1	1.3135	10	9	1.3135	8	6	1.3135	7	4	1.3135
11	10	1.3135	9	5	1.3135	11	1	1.3135	5	3	1.3135	8	5	1.3135
4	2	1.3135	3	2	1.3135	6	4	1.3135	7	3	1.3135	8	2	1.3135
11	7	1.3135	9	4	1.3135	3	1	1.3135	8	1	1.3135	9	3	1.3135
9	8	1.3135	5	4	1.3135	10	2	1.3135	2	1	1.3135	10	3	1.3135
8	7	1.3135	11	6	1.3135	7	2	1.3135	11	8	1.3135	10	8	1.3135
11	3	1.3135	10	4	1.3135	9	6	1.3135	11	4	1.3135	5	1	2.2233
6	1	2.2233	7	5	2.2233	10	5	2.2233	10	6	2.2233	7	6	2.2233

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

7	1	0.0000	11	9	0.0000	10	1	0.0000	10	7	0.0000	11	2	0.0000
9	2	0.0000	8	3	0.0000	6	5	0.0000	8	4	0.0000	4	3	0.0000
5	2	1.3134	9	1	1.3135	9	7	1.3135	6	3	1.3135	6	2	1.3135
11	5	1.3135	4	1	1.3135	10	9	1.3135	8	6	1.3135	7	4	1.3135
11	10	1.3135	9	5	1.3135	11	1	1.3135	5	3	1.3135	8	5	1.3135
4	2	1.3135	3	2	1.3135	6	4	1.3135	7	3	1.3135	8	2	1.3135
11	7	1.3135	9	4	1.3135	3	1	1.3135	8	1	1.3135	9	3	1.3135
9	8	1.3135	5	4	1.3135	10	2	1.3135	2	1	1.3135	10	3	1.3135
8	7	1.3135	11	6	1.3135	7	2	1.3135	11	8	1.3135	10	8	1.3135
11	3	1.3135	10	4	1.3135	9	6	1.3135	11	4	1.3135	5	1	2.2233
6	1	2.2233	7	5	2.2233	10	5	2.2233	10	6	2.2233	7	6	2.2233

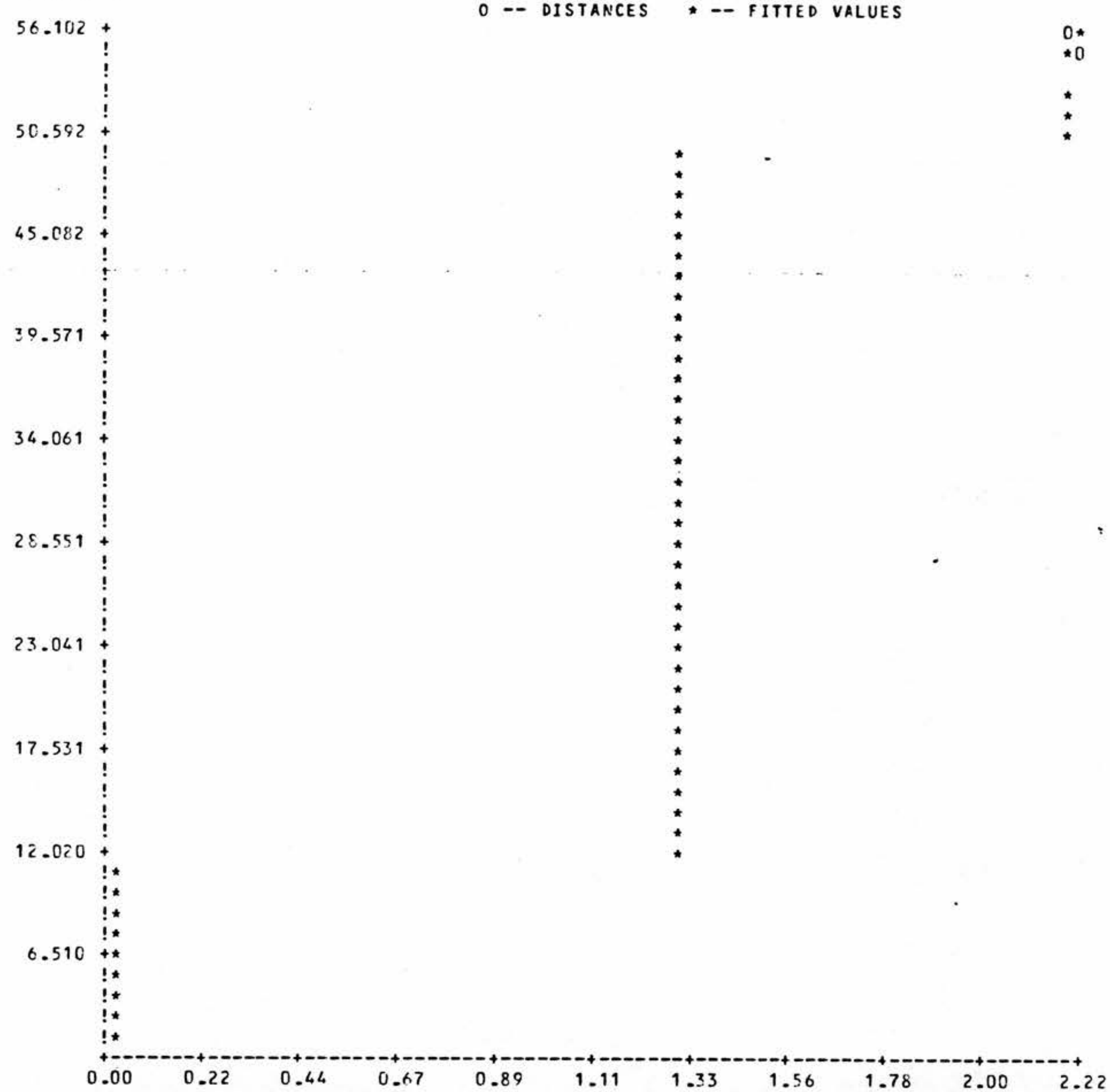
1 SHEPARD DIAGRAM

10

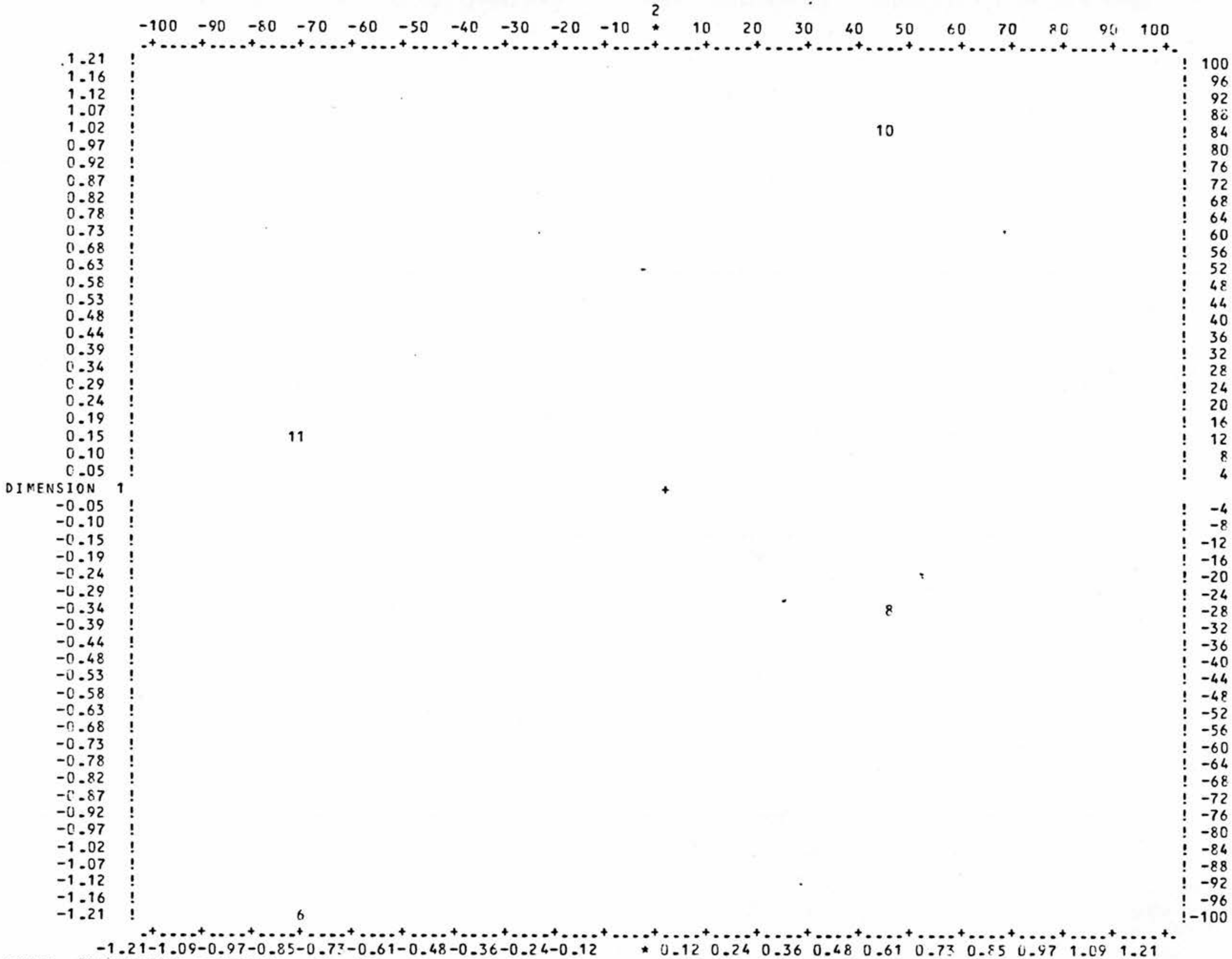
OUN2

KOWARERU

SIMILARITY



795



POINT 11 OVERLAYS POINT(S) 9 2
POINT 10 OVERLAYS POINT(S) 7 1
POINT 8 OVERLAYS POINT(S) 4 3
POINT 6 OVERLAYS POINT(S) 5
1

```
                                                  ORIGINATOR:  E.E. ROSKAM,
                                                               UNIVERSITY OF NIJMEGEN,
                                                               THE NETHERLANDS.

+------------------------------------------------------------------------------+
|                          M  D  S  (X)  PROGRAMS                              |
|                                                                              |
|   AN INTEGRATED SERIES OF MULTIDIMENSIONAL SCALING PROGRAMS WITH A COMMON COMMAND
|   LANGUAGE.                                                                  |
|                                                                              |
|   PROGRAMS AND SUPPORTING DOCUMENTATION      OTHER ENQUIRIES SHOULD          |
|   ARE DISTRIBUTED FROM                       BE ADDRESSED TO                 |
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|                                                                              |
|   USERS ARE EXPECTED TO CITE THE PROGRAM ORIGINATOR AND THE MDS(X) SERIES WHEN
|   PUBLISHING RESULTS.                                                        |
|                                                                              |
+------------------------------------------------------------------------------+

    1.     RUN NAME        YAC3
    2.     TASK NAME        YABURU
    3.     # OF STIMULI     10
    4.     PRINT DATA       YES
    5.     PARAMETERS       DATA TYPE(1),MINKOWSKI(1.0)
    6.     DIMENSION         2 TO 5
    7.     INPUT FORMAT     (10F5.0)
    8.     READ MATRIX

ROW  2  0.2700E+02

ROW  3  0.2100E+02  0.1400E+02

ROW  4  0.2600E+02  0.2900E+02  0.4000E+01

ROW  5  0.4500E+02  0.3100E+02  0.3850E+02  0.3600E+02

ROW  6  0.2500E+02  0.1000E+01  0.1200E+02  0.2800E+02  0.3000E+02

ROW  7  0.1700E+02  0.6000E+01  0.9000E+01  0.1900E+02  0.3200E+02  0.5000E+01

ROW  8  0.3500E+02  0.3700E+02  0.3850E+02  0.4250E+02  0.2000E+01  0.3400E+02
        0.4400E+02

ROW  9  0.1500E+02  0.2300E+02  0.1000E+02  0.1100E+02  0.4000E+02  0.2400E+02
        0.1300E+02  0.4250E+02

ROW 10  0.1800E+02  0.2000E+02  0.7000E+01  0.8000E+01  0.3300E+02  0.2200E+02
        0.1600E+02  0.4100E+02  0.3000E+01
```

798

2

SOLUTION IN 3 DIMENSIONS:
* *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM DESCRIPTION)

RAW STRESS DHAT = 0.000072
STRESS DHAT = 0.000851
RAW STRESS DSTAR = 0.000244
COEF. ALIEN. DSTAR = 0.001563

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA (SPENCE,MBR 1979 V14) = 0.122474

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 100
OPTIMAL SOLUTION USING DHAT WAS REACHED AFTER ITERATION 200

F I N A L C O N F I G U R A T I O N

1	-0.2321	-0.5074	0.8957
2	-0.2568	0.9410	-0.0219
3	-0.4630	0.1575	-0.4414
4	-0.2617	-0.5735	-0.8204
5	1.4122	-0.0383	-0.0101
6	-0.2565	0.9415	-0.0219
7	-0.4546	0.2483	0.4140
8	1.4126	-0.0381	-0.0093
9	-0.4491	-0.5700	0.0152
10	-0.4511	-0.5609	0.0002
OMEAN	0.0000	0.0000	0.0000
OSIGMA	0.7120	0.5556	0.4293

AC3 YABURU

DISTANCES

6	2	0.0006	8	5	0.0009	10	9	0.0176	4	3	0.8476	7	6	0.8425
7	2	0.8420	10	3	0.8434	10	4	0.8423	7	3	0.8603	9	3	0.8590
9	4	0.8563	6	3	0.9128	9	7	0.9103	3	2	0.9123	9	1	0.9091
10	7	0.9089	7	1	0.9234	10	1	0.9235	7	4	1.4954	10	2	1.5146
3	1	1.5111	10	6	1.5151	9	2	1.5236	9	6	1.5241	6	1	1.7152
4	1	1.7177	2	1	1.7148	6	4	1.7126	4	2	1.7121	6	5	1.9351
5	2	1.9351	7	5	1.9356	10	5	1.9352	8	6	1.9354	8	1	1.9350
5	4	1.9352	8	2	1.9354	5	3	1.9341	8	3	1.9346	9	5	1.9359
10	8	1.9356	8	4	1.9359	9	8	1.9363	8	7	1.9358	5	1	1.9350

AC3 YABURU

799

FITTED VALUES

3

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

6	2	0.0006	8	5	0.0009	10	9	0.0176	4	3	0.8436	7	6	0.8436
7	2	0.8436	10	3	0.8436	10	4	0.8436	7	3	0.8585	9	3	0.8585
9	4	0.8585	6	3	0.9107	9	7	0.9107	3	2	0.9107	9	1	0.9107
10	7	0.9107	7	1	0.9234	10	1	0.9235	7	4	1.4954	10	2	1.5128
3	1	1.5128	10	6	1.5151	9	2	1.5236	9	6	1.5241	6	1	1.7145
4	1	1.7145	2	1	1.7145	6	4	1.7145	4	2	1.7145	6	5	1.9351
5	2	1.9351	7	5	1.9351	10	5	1.9351	8	6	1.9351	8	1	1.9351
5	4	1.9351	8	2	1.9351	5	3	1.9351	8	3	1.9351	9	5	1.9356
10	8	1.9356	8	4	1.9356	9	8	1.9356	8	7	1.9356	5	1	1.9356

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

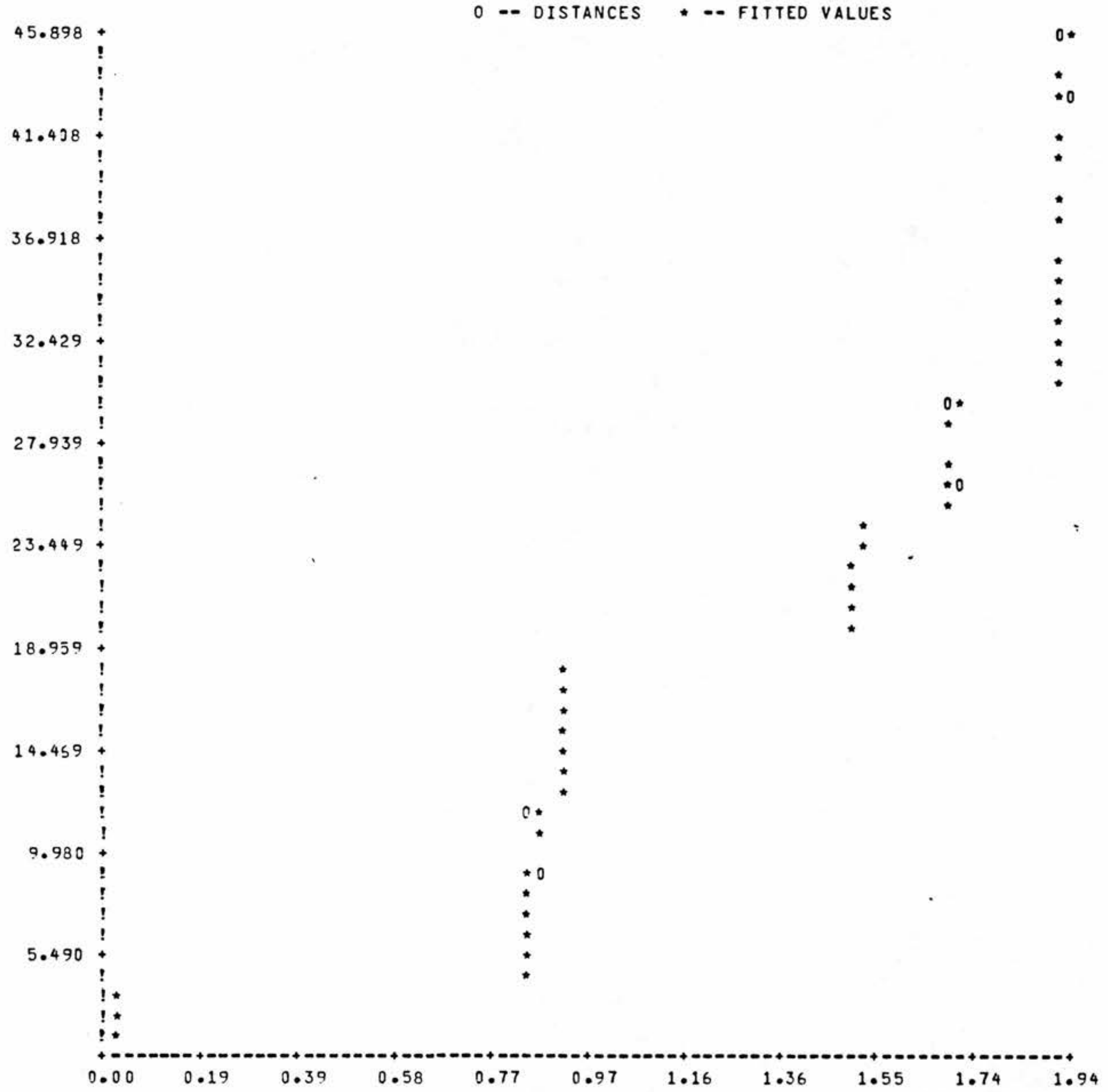
6	2	0.0006	8	5	0.0009	10	9	0.0176	4	3	0.8420	7	6	0.8423
7	2	0.8425	10	3	0.8434	10	4	0.8476	7	3	0.8563	9	3	0.8590
9	4	0.8603	6	3	0.9089	9	7	0.9091	3	2	0.9103	9	1	0.9123
10	7	0.9128	7	1	0.9234	10	1	0.9235	7	4	1.4954	10	2	1.5111
3	1	1.5146	10	6	1.5151	9	2	1.5236	9	6	1.5241	6	1	1.7121
4	1	1.7126	2	1	1.7148	6	4	1.7152	4	2	1.7177	6	5	1.9341
5	2	1.9346	7	5	1.9350	10	5	1.9350	8	6	1.9351	8	1	1.9351
5	4	1.9352	8	2	1.9352	5	3	1.9354	8	3	1.9354	9	5	1.9356
10	8	1.9356	8	4	1.9358	9	8	1.9359	8	7	1.9359	5	1	1.9363

1 SHEPARD DIAGRAM
==============

AC3.

YABURU

SIMILARITY

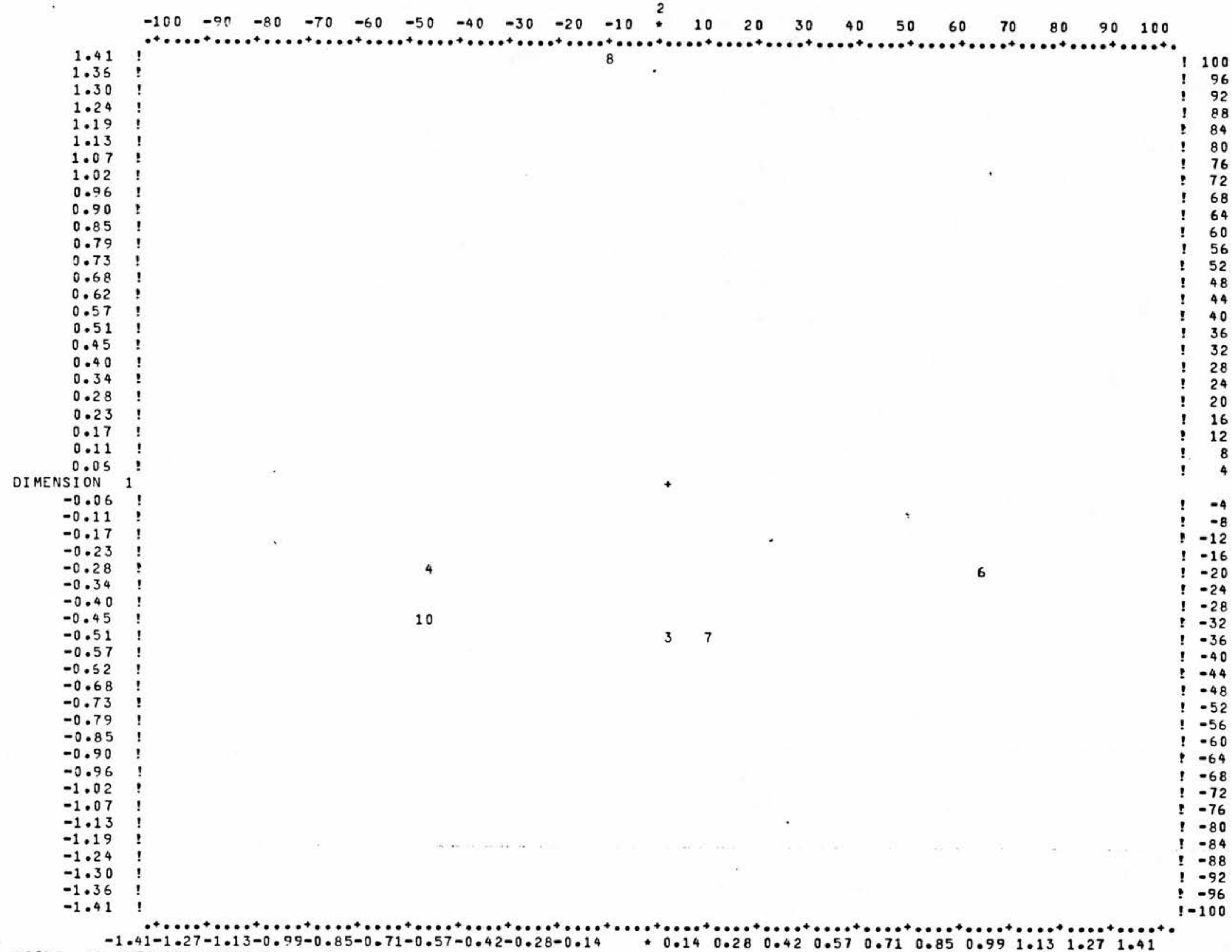


1AC3

FINAL CONFIGURATION

DIMENSION 2 PLOTTED AGAINST DIMENSION 1

YABURU



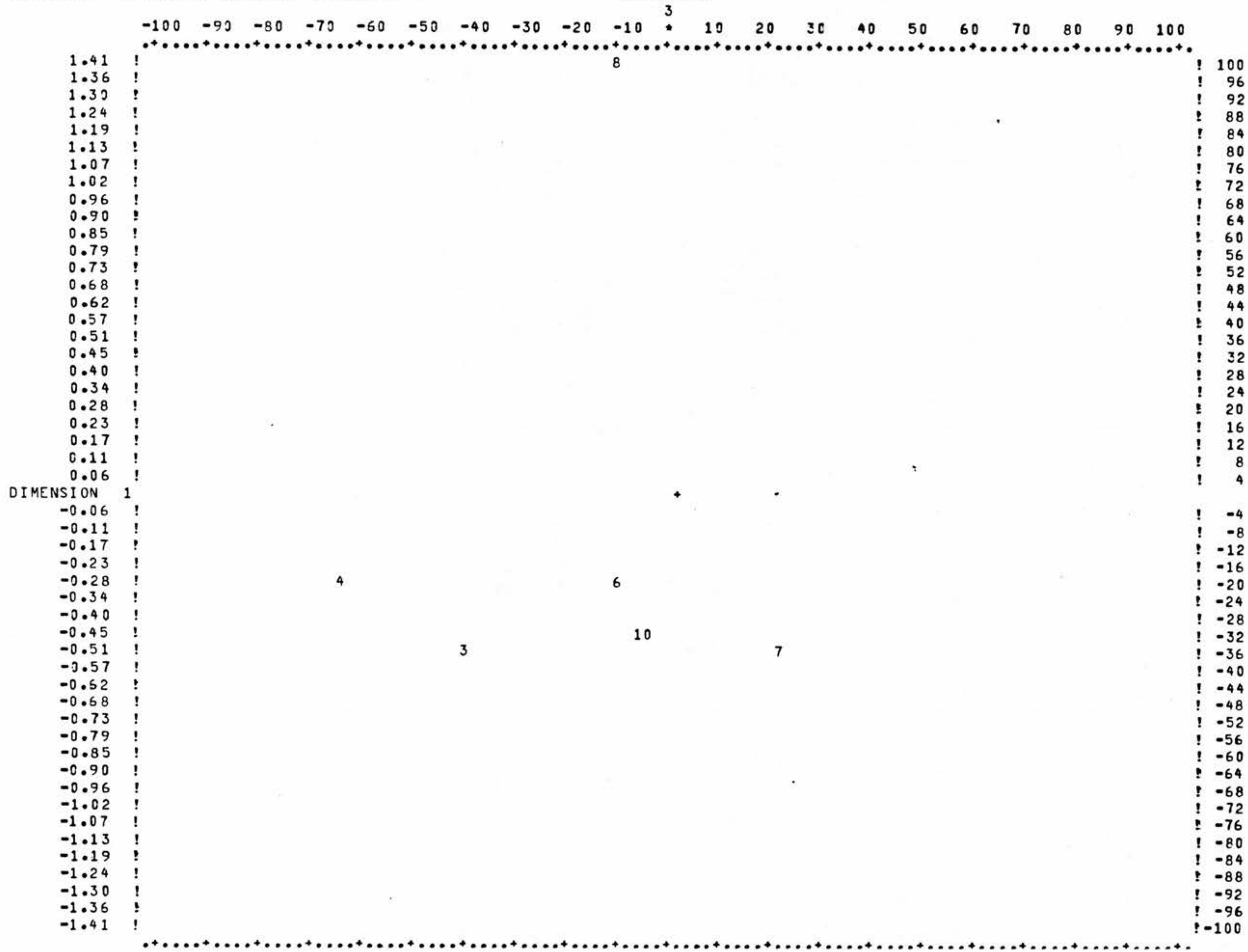
POINT 10 OVERLAYS POINT(S) 9

POINT 8 OVERLAYS POINT(S) 5

1AC3'
FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 1

YABURU

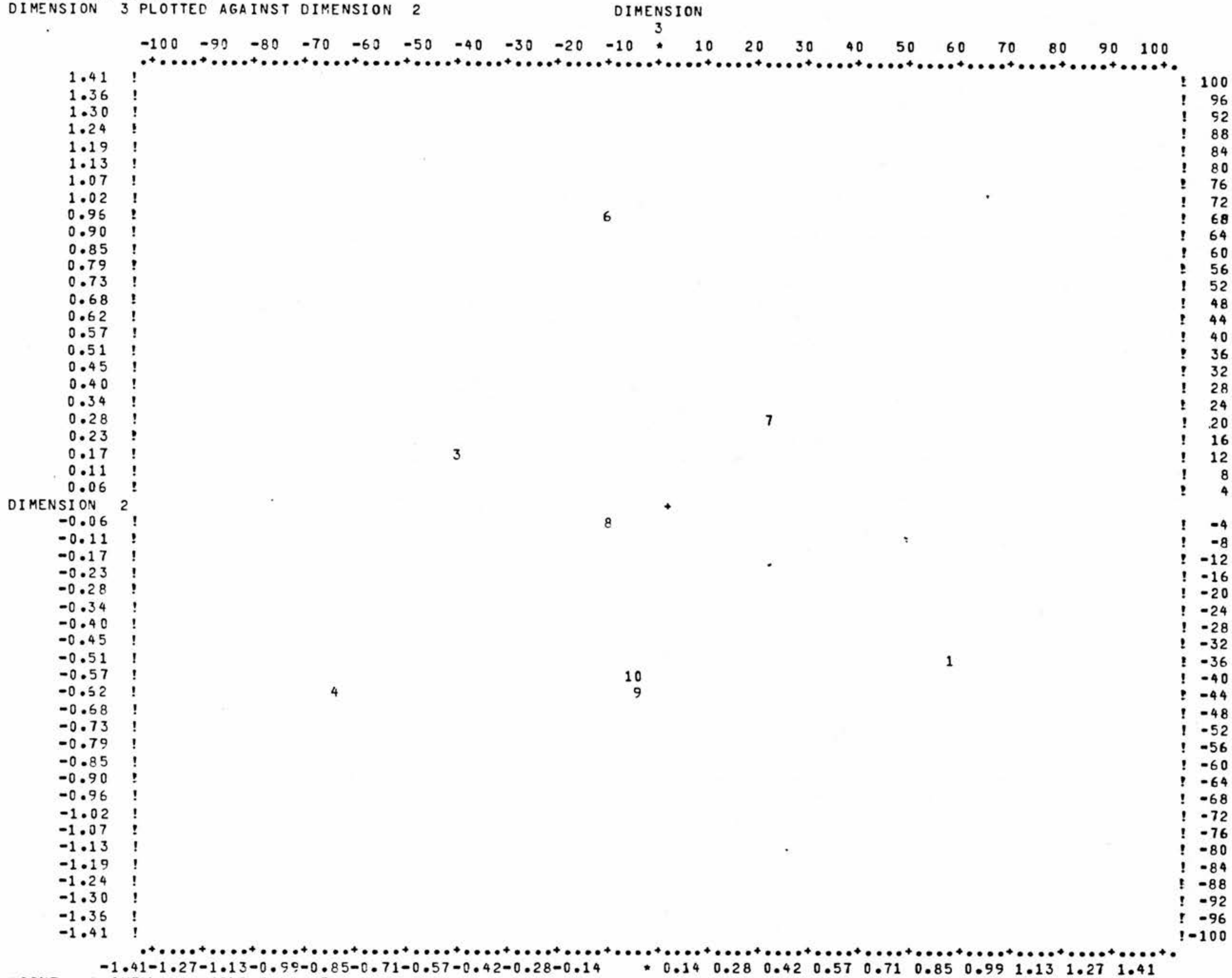
6



802

FINAL CONFIGURATION
DIMENSION 3 PLOTTED AGAINST DIMENSION 2

7



POINT 8 OVERLAYS POINT(S) 5
POINT 6 OVERLAYS POINT(S) 2

803

8

804

```
SOLUTION IN  2 DIMENSIONS:
 *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

FIT= DHAT ; ALGORITHM= HARD SQUEEZE; (SEE PROGRAM  DESCRIPTION)

RAW STRESS DHAT      =      0.000000
STRESS DHAT          =      0.000005
RAW STRESS DSTAR     =      0.000000
COEF. ALIEN. DSTAR   =      0.000007

STRESS1 BASED ON APPROXIMATION TO RANDOM DATA  (SPENCE,MBR 1979 V14) =      0.154917

OPTIMAL SOLUTION USING DSTAR WAS REACHED AFTER ITERATION 100
OPTIMAL SOLUTION USING DHAT  WAS REACHED AFTER ITERATION 128


F I N A L   C O N F I G U R A T I O N
     1     -0.5000      0.0000
     2     -0.5000      0.0000
     3     -0.5000      0.0000
     4     -0.5000      0.0000
     5      2.0000      0.0000
     6     -0.5000      0.0000
     7     -0.5000      0.0000
     8      2.0000      0.0000
     9     -0.5000      0.0000
    10     -0.5000      0.0000
 0MEAN     0.0000      0.0000
 0SIGMA    1.0000      0.0000


AC3                                                                YABURU

DISTANCES

  6  2  0.0000    8  5  0.0000   10  9  0.0000    4  3  0.0000    7  6  0.0000
  7  2  0.0000   10  3  0.0000   10  4  0.0000    7  3  0.0000    9  3  0.0000
  9  4  0.0000    6  3  0.0000    9  7  0.0000    3  2  0.0000    9  1  0.0000
 10  7  0.0000    7  1  0.0000   10  1  0.0000    7  4  0.0000   10  2  0.0001
  3  1  0.0001   10  6  0.0001    9  2  0.0001    9  6  0.0001    6  1  0.0001
  4  1  0.0000    2  1  0.0001    6  4  0.0001    4  2  0.0000    6  5  2.5000
  5  2  2.5000    7  5  2.5000   10  5  2.5000    8  6  2.5000    8  1  2.5000
  5  4  2.5000    8  2  2.5000    5  3  2.5000    8  3  2.5000    9  5  2.5000
 10  8  2.5000    9  8  2.5000    8  4  2.5000    8  7  2.5000    5  1  2.5000
```

805

AC3 YABURU 9

FITTED VALUES

PAIR DHAT (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

6	2	0.0000	8	5	0.0000	10	9	0.0000	4	3	0.0000	7	6	0.0000
7	2	0.0000	10	3	0.0000	10	4	0.0000	7	3	0.0000	9	3	0.0000
9	4	0.0000	6	3	0.0000	9	7	0.0000	3	2	0.0000	9	1	0.0000
10	7	0.0000	7	1	0.0000	10	1	0.0000	7	4	0.0000	10	2	0.0001
3	1	0.0001	10	6	0.0001	9	2	0.0001	9	6	0.0001	6	1	0.0001
4	1	0.0001	2	1	0.0001	6	4	0.0001	4	2	0.0001	6	5	2.5000
5	2	2.5000	7	5	2.5000	10	5	2.5000	8	6	2.5000	8	1	2.5000
5	4	2.5000	8	2	2.5000	5	3	2.5000	8	3	2.5000	9	5	2.5000
10	8	2.5000	9	8	2.5000	8	4	2.5000	8	7	2.5000	5	1	2.5000

PAIR DSTAR (PAIRS ARE ORDERED ACCORDING TO VALUES IN INPUT MATRIX)

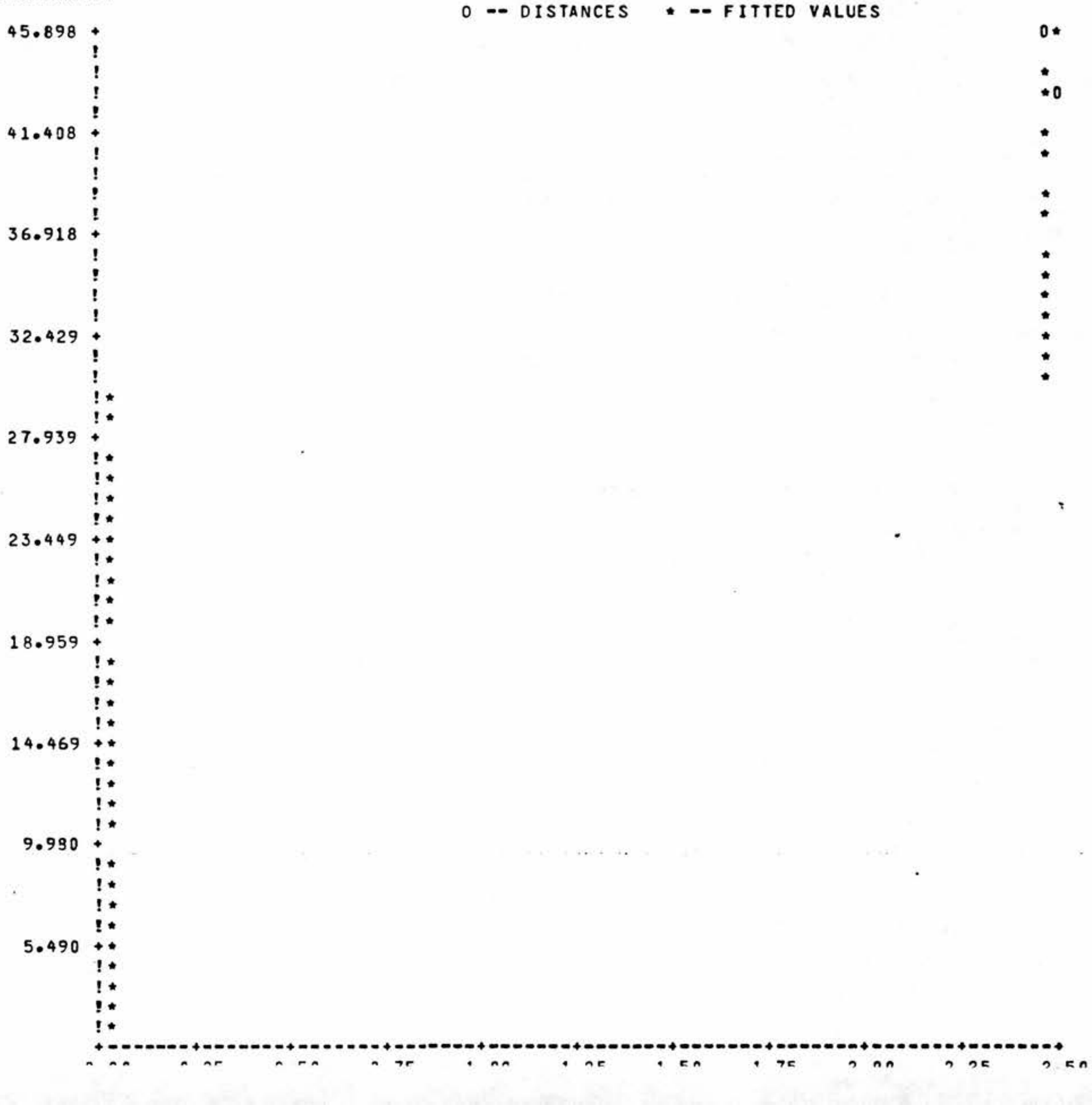
6	2	0.0000	8	5	0.0000	10	9	0.0000	4	3	0.0000	7	6	0.0000
7	2	0.0000	10	3	0.0000	10	4	0.0000	7	3	0.0000	9	3	0.0000
9	4	0.0000	6	3	0.0000	9	7	0.0000	3	2	0.0000	9	1	0.0000
10	7	0.0000	7	1	0.0000	10	1	0.0000	7	4	0.0000	10	2	0.0000
3	1	0.0000	10	6	0.0001	9	2	0.0001	9	6	0.0001	6	1	0.0001
4	1	0.0001	2	1	0.0001	6	4	0.0001	4	2	0.0001	6	5	2.5000
5	2	2.5000	7	5	2.5000	10	5	2.5000	8	6	2.5000	8	1	2.5000
5	4	2.5000	8	2	2.5000	5	3	2.5000	8	3	2.5000	9	5	2.5000
10	8	2.5000	9	8	2.5000	8	4	2.5000	8	7	2.5000	5	1	2.5000

1 SHEPARD DIAGRAM

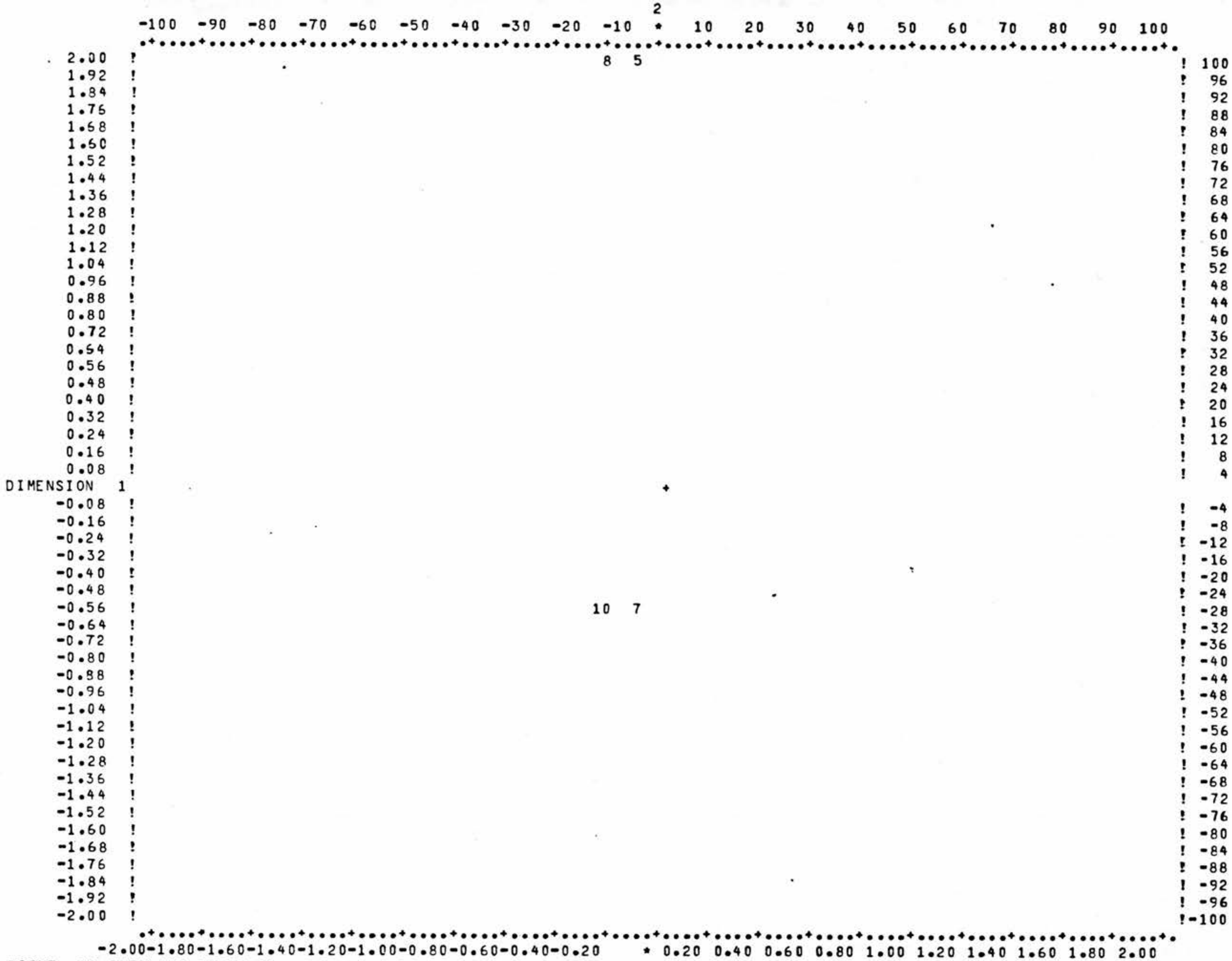
AC3

YABURU

SIMILARITY



11




```
POINT  10 OVERLAYS POINT(S)    9   4   1
POINT   7 OVERLAYS POINT(S)    6   3   2
1
            10.     FINISH
```